QUICKSTUDY
Application servers promise to give users the information they need and ease support woes. Page 66



YOU & CO.
Three IT contractors share their advice on starting your own consulting business. Page 58

COME FLY WITH ME
We test online travel services and find human travel agents more than hold their own. Page 80

COMPUTERWORLD

THE NEWSPAPER FOR IT LEADERS • WWW.COMPUTERWORLD.COM

APRIL 12, 1999 • VOL. 33 • NO. 15 • $4 COPY

TOMORROW'S IT

THE FUTURE OF THE IT ORGANIZATION



PETER DUPRE, CIO at office supply distributor W. B. Mason, says the CIO of the future will have to be in sync with the CEO

With help from 26 CIOs, Computerworld set out to identify the characteristics of the IT organization of the next five years. Some of the features are already showing up, but others will surprise you.



THE ORGANIZATION: Think of a smaller, rapid-response IT department that's deeply integrated with the business units — the boundaries may even disappear. Expect more outsourcing and a keen appreciation of project management.

THE PEOPLE: Business savvy will be critical to IT careers. CIOs may even recruit from the ranks of consulting firms because they need people who think of themselves as "businesspeople with an IT specialty."

THE TECHNOLOGY: Prepare to manage the intelligent networks that make virtual corporations work and to deal with the exploding ranks of mobile workers. By 2003, a third of U.S. workers will access servers remotely.

Special Report begins on page 61

USERS FIND RELIEF IN WIN 98 MOVE

OS upgrade could buy IT shops time, but critics warn of bumpier path to Win 2000

BY SHARON GAUDIN
LOS ANGELES

When Microsoft Corp. anoounced last week that it will extend the Windows 9x family of desktop operating systems with one more release next year, some corporate users wary of the effort involved in a Windows 2000 upgrade jumped at the thought of an alternative — even one Microsoft has been targeting at consumers.

David Cole, vice presideot of Microsoft's Web client and coosumer division, said the company is still planning on "dead-ending the Windows 98 code base," but not just yet. "We've been talking to users and [PC makers], and we were pretty shocked at their comments," Cole said. "We can't find one consumer who cares about the kernel.... A lot of them value their 3-year-old applications more than some new ones. They don't want to give up on the computer they have today."

"We'd take a look at another version of Windows 98," said Brian Brumit, a director at PricewaterhouseCoopers.

"Their penetration oo our 160,000 employees' desktops is so vast that to change that amount of software and hardware to bring in Windows 2000 would be incredible," Brumit said. "Microsoft is naive to think we want or can do that. Maybe another up-

Windows 9x, page 16

JUST THE FACTS

Windows Timetable

Third beta, Windows 2000: End of this month

Windows 98 Service Pack 1: This summer

Windows 98 Second Edition: This summer

Windows 2000 official shipment: October

Windows 98 upgrade: 2000

SOURCE: MICROSOFT CORP., REDMOND, WASH.

EUROPEAN CARMAKERS EYE EXTRANET

Continentwide project will link to U.S. network

BY BOB WALLACE

European automakers and their suppliers are working on an ambitious project to create a pan-European version of the U.S. auto industry's extranet, the Automotive Network Exchange, *Computerworld* has learned.

Besides improving communications among industry participants, the extranet offers a potential cost-cutting benefit: Users will need only one network link instead of multiple private lines to each of their trading partners.

The undertaking, which could be completed in the first half of next year, will let European automakers share missioo-critical data such as electronic data interchange transactions and designs with sup-

Carmakers, page 101

ARE U.S. PROGRAMMERS SLACKERS?

Their productivity lags others', study suggests

BY THOMAS HOFFMAN
NEW YORK

U.S. programmers, their jobs protected by the labor shortage, have become complacent and less productive than their international peers, according to a study of 16,000 information technology professionals in 28 nations.

The study, released here last week, was prepared by researcher Howard Rubin for Meta Group Inc. in Stamford, Conn. Using a standard measure of IT productivity based on the number of lines of code developed by a programmer per year, the study pegged U.S.

Programmers, page 101

COST EQUIVALENT OF ONE U.S. IT WORKER IN OTHER NATIONS

France	1.2
Germany	1.2
England	1.3
China	1.5
Australia	1.8
Mexico	5.0
India	8.7

SOURCES: RUBIN SYSTEMS INC., POUND RIDGE, N.Y., AND META GROUP INC., STAMFORD, CONN.

NEWSPAPER
$$XBSJFT# ##########S-DIGIT 48106
#48106UIZ134PR007# JUL 96 001 8840
U M I 114
PERIODICALS
PO BOX 1346
ANN ARBOR MI 48106-1346



The SAS Data Warehousing Solution

Making it Easy to Deliver the Right Data...to the Right Decision Makers

Datamation Product of the Year

Category: Data Warehousing

Readership Award 1997

Category: Data Warehousing

So much business data. Scattered in so many places throughout your company. Is it any wonder you find it difficult to provide access to consistent, reliable, and timely information to fuel effective decisions? The SAS Data Warehousing Solution—from the world's leading decision support provider—helps you meet the challenge.

What's more, we'll guide you every step of the way—from getting started to managing your data warehouse. One solution brings you the approach, technology, and resources you need. We'll provide the entire solution, or integrate easily with your existing technologies.

The SAS Data Warehousing Solution lets you provide a *single* version of the truth to your entire business community... as you make optimal use of your existing hardware, software, and data.

The Data Warehousing Product of the Year

See for yourself why 200,000 IT managers named the SAS solution their Data Warehousing Product of the Year... for two years running. Visit us at **www.sas.com/dw** for more information and to request a **free** SAS Data Warehousing mouse pad.

Data Integrity and Quality

Seamless Integration and Process Automation

Maximum Return on Investment

Strategic Partnerships

Step-by-Step Implementation

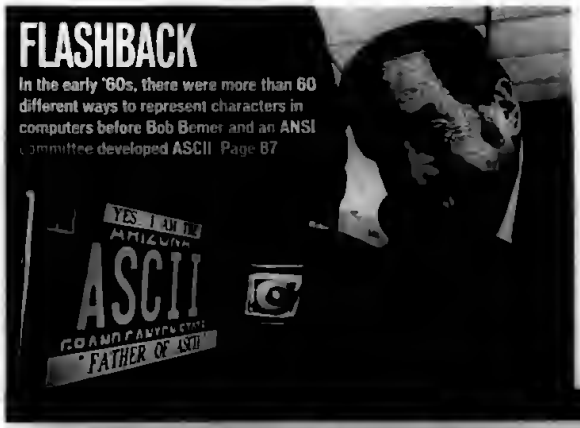
Web Enabled

Year 2000 Compliant

SAS® **SAS Institute Inc.**

The Business of Better Decision Making

In Canada phone 1 800 363 8397 SAS is a registered trademark of SAS Institute Inc Copyright © 1998 by SAS Institute Inc



FLASHBACK

In the early '60s, there were more than 60 different ways to represent characters in computers before Bob Bemer and an ANSI committee developed ASCII. Page 87



GET CREATIVE

Want to reach the lucrative teen audience? Creative promotions on the Web are the way to go, advertising executive Chris Jones says. Page 50

COMPUTERWORLD THIS WEEK

APRIL 12, 1999

NEWS 4

4 **NISSAN PREPARES** to outsource IT infrastructure at U.S. sites — and maybe worldwide.

6 **FTC MAY PRESS** for online privacy regulations, if study reveals continuing abuses.

8 **TELECOMMUTING** growth slows; jobs that can be done remotely are outsourced more often.

10 **MICROSOFT AGREES** to improve temp worker policies, as it faces pressure and lawsuits from temps.

12 **ORACLE USERS DEBATE** upgrade to Internet version as aooual gathering approaches.

14 **UN ASKS IT PEOPLE** to volunteer time to help cure international Y2K problems.

20 **AMAZON AND WAL-MART** settle employee-raiding suit, but the terms raise coocerns for company recruiters.

24 **BROKERAGES FALTER** as models of how to handle e-commerce, but offer lessons for others in the process.

33 **IBM MORPHS** its PC business model into one that's distinctly Asian, David Moschella writes.

MORE

Company Index 100
Editorial Letters 32
How to Contact CW ... 100
Inside Lines 102
Stock Ticker 99

BUSINESS 41

44 **REGIONAL STORES** retaliate against retail giants by fighting for market share online.

44 **INSURER FINDS** savings with claims system that made care faster *and* cheaper.

48 **YEAR 2000 PLANNERS** who ignore help desk needs could stop projects cold.

50 **COUNTY FINDS** electronic bid system draws more bids than before, gets lower prices, cuts paperwork.

OPINION

56 **MIDDLE MANAGERS,** not the top people, drive innovation in IT these days, Peter G. W. Keen writes.

57 **BURNING OUT STAFF** isn't the nicest HR strategy, but it might work for you, author Thomas Ferratt suggests.

58 **SOLO CONSULTING** offers some nice advantages if you start in the right way.

59 **PRICE MISLEADS** those who use it to figure out who should make tbeir sbort list, Joe Auer cautions.

TECHNOLOGY 71

SOFTWARE

73 **EARLY NOTES USERS** like Release 5's improved user interface and its administration tools.

73 **SUN/NETSCAPE** alliance may force IT to rewrite large parts of applications.

74 **SOLID NICHES,** installed base will help carry C++ into the future, despite Java's inroads.

HARDWARE

75 **SQUEEZING OUT** that last percent of dowotime eats resources. Is it worth it?

75 **COMPAQ ADDS** SAN tool aimed at the enterprise.

NETWORKS

77 **MOBIL SAYS** its satellite-based network is faster and more reliable than earthbound nets.

OPINION

82 **FRANKLY SPEAKING:** Why, asks Frank Hayes, are IT people the biggest Luddites in the organization?

84 **XML STANDARD** may help IT tame an otherwise chaotic Web.

SPECIAL REPORT

The Future of the IT Organization

Users absorb IT into business divisions, but the hard-core stuff stays centralized **(page 62).** Success will come to IT folk who can turn data into knowledge, and knowledge into a business advantage **(page 66).** Technology morphs into a mesh of nets and net-aware applications that link customers, suppliers and mobile workers **(page 68).**

WHAT I'M SEEING ARE PROGRAMMERS SAYING, 'TO HELL WITH IT. I'M NOT GOING TO PUSH AS HARD AS I USED TO.'

EO YOURDOR, AUALYST, CUTTER CORSORTIUM, OR PRORRAMMER BURNOUT. SEE PARE 1

AT DEADLINE

No More IT Layoffs In Bank One Merger

Most information technology employees at the merging Bank One Corp. and First Chicago NBD Corp. are expected to remain with the company until after systems consolidation work is completed, a company spokesman said. The Chicago-based Bank One Corp. said in a Securities and Exchange Commission filing that merger plans called for 4,700 job cuts. A spokesman said deals with outsourcers already had off-loaded 900 IT workers, and the rest "are needed for systems consolidation."

Delphi Picks HP For ERP Assist

Delphi Automotive Systems Corp., a $28.4 billion car parts maker that's being spun off by General Motors Corp., signed Hewlett-Packard Co. to provide hardware for an upcoming SAP R/3 rollout and run the enterprise resource planning applications in an outsourcing deal. The deal is valued at more than $25 million over three years. Delphi, in Troy, Mich., chose HP over former GM subsidiary Electronic Data Systems Corp., which runs some European R/3 installations for Delphi.

Cisco Buys Start-Ups

Cisco Systems Inc. said it would buy two start-ups, Fibex Systems in Petaluma, Calif., and Sentient Networks Inc. in Milpitas, Calif., for a combined $445 million in stock. The duo make equipment that let service providers move from older circuit-switched networks to newer cell and packet-based networks.

Short Takes

Internet registrar NETWORK SOLUTIONS INC. (NSI) and the U.S. COMMERCE DEPARTMENT were in talks over NSI's redirecting visitors to its own corporate Web site from the InterNIC Internet domain registration site. . . . Starting at $600,000, INFORMIX CORP. this week will announce a program called i.Sell, designed to give users a package of tools and applications for online merchants.

NISSAN CLOSE TO OUTSOURCING IT

IBM likely to get carmaker's contract

BY JULIA KING AND BOB WALLACE

Nissan North America Inc. in Torrance, Calif., is poised to outsource information technology operations at several U.S. locations to IBM Global Services, *Computerworld* has learned.

IT workers at Nissan facilities in Irving, Texas, and Englewood, Colo., said IBM met with employees last week to brief them on their employment options. Nissan confirmed that it's working with IBM.

"Nissan North America has initiated an outsourcing feasibility study with IBM Global Services to review [our] information systems functions, structures and costs," the automaker said in a statement. "We expect the study to take about two months, after which time IBM will provide us recommendations."

According to a Nissan worker who was briefed, the outsourcing proposal covers mainframes, distributed systems, private branch exchanges, in short, Nissan's entire technology infrastructure.

"My assumption is that this is really going to happen, and I think the intention is for [the deal] to be global," the Englewood worker said.

In Irving meanwhile, a senior programmer analyst said he was also briefed, along with about 50 other IT workers in Texas. "IBM made a presentation which sounded like they were desperate for people and would probably make offers to almost everyone if they reached an agreement with Nissan," the Irving worker said. "Maybe they want to make sure people don't run out the door."

Typically, IBM offers employment to all workers who are directly affected by operations outsourced to the company, said David Bisaillon, IBM's director of human resources. The IT professionals usually are hired at their same salaries, but they're switched over to IBM's benefits plans. About 80% of those offered positions at IBM accept the jobs, he said.

Richard Henderson, an auto industry analyst at Donaldson, Lufkin and Jenrette Inc. in Jersey City, N.J., said he wouldn't be surprised to see the Nissan/IBM deal go through.

"[Automakers] can't try to do all the technology work themselves because it's fraught with obsolescence. It behooves them to pass along as much of this work and have the outsourcer assume the technical risk," Henderson said.

With the globalization of markets and the erosion of price flexibility, outsourcing is gaining momentum in the auto industry, he said. ◗

Compaq Backs IBM's Monterey Project for Blended Unix

Boosts multivendor effort to build server

BY JAIKUMAR VIJAYAN

Compaq Computer Corp.'s support for the Monterey project lends momentum to the multivendor effort to build a broadly accepted Unix version for Intel Corp.'s forthcoming IA-64 chips.

Monterey is the code name for a merged Unix version being developed by IBM, The Santa Cruz Operation Inc. (SCO) and Sequent Computer Systems Inc. for 64-bit Intel chips, which are expected to start shipping by the middle of 2000.

Compaq said it will offer the merged Unix on its 64-bit Intel servers. That should bolster efforts by Monterey vendors to garner wider software support, analysts said.

Compaq is one of the leading vendors of Unix on Intel systems, so its presence on the Monterey team means software vendors now have a larger market to write applications for, said Tony Iams, an analyst at D. H. Brown Associates Inc. in Port Chester, N.Y.

For users, that means more Unix applications by the time the first 64-bit Intel systems ship. "The number of applications available for a platform is usually directly proportional to its market volume" and vendor support, Iams said.

The biggest promise of Monterey is that it will blend elements of IBM's high-end AIX Unix with the easy-to-use SCO UnixWare, said Robert Celmer, a senior technology adviser at Autozone Inc., an auto parts retailer in Memphis.

"We are going to want to take advantage of Monterey on 64-bit systems when it starts shipping" for the greater performance it will offer, Celmer said. The company runs SCO UnixWare on Intel systems in its 2,700 stores nationwide.

Compaq's move highlights the groundswell of vendor activity in preparation for IA-64, as Intel's 64-bit architecture is called. In a separate announcement, Compaq, IBM, SCO, Sequent and Hewlett-Packard Co. said they will develop standard application programming interfaces and binary interfaces, which should make it easier for vendors to develop Unix software for IA-64 systems. HP and Sun Microsystems Inc. are also working on porting their Unix versions to IA-64. ◗

JUST THE FACTS

Vendors for Monterey

Database: IBM, Informix and Sybase

Tools and middleware: IBM, Tivoli, BEA Systems, BMC and Novell

Internet and electronic-commerce applications: Lotus and Netscape

ERP: SAS Institute, PeopleSoft, Baan and J. D. Edwards

Refugee Database To Track Kosovars, Families

BY STACY COLLETT

International relief organizations plan to develop a database of expatriate Kosovars to help determine citizenship and reunite separated families once the refugee crisis in and around Kosovo has passed the emergency stage, relief workers said.

"Once we have these people sheltered and fed, and refugee camps are established, then we'll computerize the system," said Panos Moumtzis, a spokesman for the UN High Commissioner for Refugees in Washington.

Tens of thousands of ethnic Albanians who fled the Kosovo region during the past three weeks, most without any form of identification, were "registered" with pencil and paper at the borders of Albania and Macedonia, Moumtzis said. The UN said more than 500,000 ethnic Albanians have left the former Yugoslavia during the past year.

In a few weeks, the International Organization of the Red Cross in Geneva will start work on a refugee tracing system similar to the one used in Bosnia-Herzegovina, started in 1992, when residents fled their war in the early 1990s.

The system, which includes a CD-ROM with photos and names of thousands of refugees, was brought to remote camps around Bosnia and distributed on the Web to Germany, Australia and the U.S.

Red Cross officials said the Kosovo database won't be posted on the Internet because most missing relatives are confined to Albania and Macedonia, and a worldwide search isn't needed, according to Doris Pfister, a Red Cross spokeswoman in Geneva. ◗



FASTER DATA WAREHOUSING

Got mountains of data in a dozen different formats that you need to select, reformat, aggregate, and sort? SyncSort™ is optimized to do the job — fast. Use it with more specialized warehousing tools to slash your processing time. To arrange a **free trial** or for a free copy of our booklet, "Six Data Warehouse Tasks Made Easier with Syncsort," visit us at **www.syncsort.com/49cws.**

syncsort

Tel (201) 930-8200 dept. 49CWS
www.syncsort.com/49cws

©1999 Syncsort Incorporated All trademarks are property of their respective owners

Visit us at International Oracle Users Group-America, Denver Conv. Ctr., Denver; April 12-14, Booth 703-802.

Legal Thumbs-Up for Raytheon Employee Suit

Privacy groups chilled by ISP subpoenas

BY STEWART DECK

Privacy advocates may be disturbed by what they see as Raytheon Co.'s draconian efforts to plug information leaks, but trade secrecy lawyers say the defense contractor is following the rule of law in filing a lawsuit against 21 employees.

But some privacy advocates are concerned and have begun to call for stricter guidelines for gathering online identities from Web portals and Internet service providers.

Marc Rotenberg, director of the Electronic Privacy Information Center in Washington, said Net providers should fight those record requests because such personal information "is held in trust" by both the providers and online communities. "There's a real privacy issue there," he said.

Other advocates, including the Electronic Frontier Foundation, said subpoenas seeking identity data can be granted too easily.

Requiring warrants, which need more proof of wrongdoing before being issued, could be a better solution for such searches, they said.

Raytheon has subpoenaed a number of Internet service providers in a continuing effort to identify employees who allegedly posted proprietary information in public Internet chat areas (CW, April 5).

To unmask the Internet posters, Raytheon filed suit against 21 "John Does" and then sought identity data records from Internet providers and online portals.

In a similar case, software maker Phoenix International Ltd. has subpoenaed Yahoo Inc. for the identities of seven Yahoo chat-room participants (possibly former Phoenix employees) who the company claims caused its stock price to fall by defaming it.

Most online portal bulletin boards state that they won't disclose users' communications unless required by law and that users who post tortious or actionable information do so at their own liability.

"Yahoo is required to give that information. That's been the common requirement, assuming the facts that suggest that someone's engaged in unlawful conduct. It's an old message in a new media: Employees can't disclose trade secrets or confidential info," said Gregg Williams, a lawyer who specializes in privacy issues at Fenwick & West LLP in Palo Alto, Calif.

"The employer has a private property interest in its trade secrets and confidential information," he added.

PRIVACY LAWS COMING IF NET 'SWEEP' SHOWS NO PROGRESS

FTC to gauge state of Web self-regulation

BY PATRICK THIBODEAU
WASHINGTON

THE U.S. Federal Trade Commission (FTC) so far has favored self-regulation on privacy issues. But that could change if a federal study under way shows little progress by commercial Web sites in establishing meaningful privacy policies on their sites, said Federal Trade Commission Chairman **Robert Pitofsky** in a *Computerworld* interview.

Q: IBM recently announced that it will pull its advertising dollars from Web sites that fail to disclose their privacy policy. What will this accomplish?

A: I think it's a very constructive step by IBM. They have been a leader among major corporations in this country in recognizing the need to achieve privacy protection on the Internet. My hope is that other companies will follow the lead.

Q: The FTC last year supported a law that protects the personal data of children. With that exception, the FTC has favored industry self-regulation on privacy. Why?

A: The case for protecting children from invasion of their privacy is so strong that we felt that there was no reason to delay in recommending legislation. When it comes to adults, the issues become more complicated. Our thought has been that self-regulation is more flexible, and companies have a better idea of their own needs. If self-regulation turns out to be inadequate, we have no doubt that Congress will and should step in.



FTC'S ROBERT PITOFSKY: IBM plan is "very constructive"

Q: How will the FTC determine if self-regulation is working, and at what point do you say it failed?

A: We ran a sweep of a great number of Internet commercial sites about a year ago and found that disclosure of privacy policies was really disappointing. A second sweep has been run by an academic group at Georgetown University. We hope to have a report by the end of this month [or] the beginning of May. The first thing ... is to compare what they found today to the baseline that we established a year ago and see if there's been substantial progress.

Q: What is "substantial progress"?

A: It's hard to answer that. ... We found a year ago that only 14% of the sites on the Internet had published privacy policies, but we really want to look behind what the numbers are now and think about the quality of the policies: how clear they are, how understandable they are.

Q: How important will the new survey be in determining whether the FTC seeks privacy regulations?

A: If no progress or very little progress has been made, I have no doubt that the move toward legislation will be energized.

Q: If the FTC were to seek privacy regulations, what kind of protections would it seek?

A: It would include notice as to what kind of privacy protections would be made available; some arrangement for consent so that people can opt in or opt out if they don't want personally identifiable information used for any reason other than to close the transaction; some arrangement for access, so that if errors creep in to the database, consumers have an opportunity to correct them; and a range of security arrangements that would protect consumer privacy.

Q: Why should a company establish a privacy policy? Isn't the caveat "buyer beware" warning enough?

A: I don't think so. I really think it's in the business community's interest, if they care about the development of electronic commerce, to develop meaningful privacy policies.

Privacy Protection Tools Gain Support at Confab

BY ANN HARRISON
WASHINGTON

Microsoft Corp. and the privacy group Truste last week offered a proposal to help webmasters post privacy statements and help consumers decide how much personal data they're willing to release at Web sites.

They have developed Privacy Wizard, a tool that lets webmasters create a privacy policy in a standard format by answering a series of questions. Privacy Wizard is available at no charge at *http://privacy.linkexchange.com/*. Privacy is a major consumer concern about Web commerce, yet a U.S. Federal Trade Commission survey last year found that only 14% of Web sites disclose their privacy and information practices.

Privacy Wizard may accelerate the emergence of a long-anticipated Web privacy protocol being developed by the Privacy Preferences Project (P3P), which is run by the World Wide Web Consortium standards group in Cambridge, Mass.



U.S. REP. ED MARKEY: The P3P effort won't preclude legislation

U.S. Rep. Ed Markey (D-Mass.), who spoke at the Computers, Freedom and Privacy conference where the initiative was announced, said that although P3P is promising, federal legislation is still needed to ensure that companies post clear and enforceable privacy policies.

The P3P specification calls for privacy policies to be written in an Extensible Markup Language document that can be read on the Web page and by consumers' browsers. Then, a site — using P3P software on its Web server — could tell a P3P-compatible browser how it would use personal data

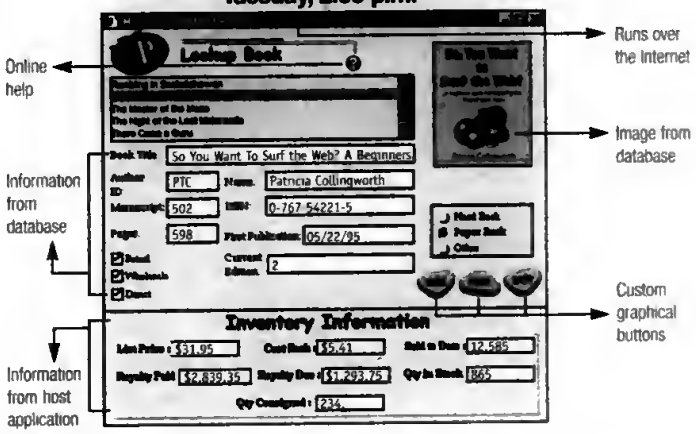
But Lorrie Faith Cranor, a researcher at AT&T Labs-Research in Florham Park, N.J., and a P3P working group member, said she's concerned that Privacy Wizard may prompt webmasters to take shortcuts that don't result in thoroughly researched privacy policies.

Introducing The Quickest Way To Put Your Entire Enterprise On The Web.

Monday, 9:00 a.m.



Tuesday, 2:00 p.m.



What used to take years, now takes days.

With Opal™, you can quickly transform your legacy applications into secure, Web-enabled applications. And deploy them just as fast.

INFORMATION IN HARMONY™

Of course, it may take some time for your users to recognize these legacy applications with their new multimedia interfaces that go far beyond HTML and Java. But in no time at all, everyone will appreciate these new smarter, friendlier applications that are easier to deploy, and much easier to use and support.

Just think of all that you could do with technology like this.

For more information, call **1-877-GET OPAL**, or visit **www.cai.com/ads/opal**.

Quick.



COMPUTER® ASSOCIATES
Software superior by design.

Opal™

Modernizing Legacy Applications™

© 1998 Computer Associates International Inc. Islandia, NY 11788-7000
All product names referenced herein are trademarks of their respective companies.

BRIEFS

Sun Posts Fix for Java 2 Security Flaw

Sun Microsystems Inc. has posted to its Web site (www.sun.com) a fix for a security flaw within Java 2. Caused by a coding error, the flaw lets an attacker create a booby-trapped Web page from which an attacker can seize control of a viewer's machine. Microsoft Corp.'s latest Java virtual machine is immune, but Sun and Netscape Communications Corp. browsers aren't.

Weapons Labs Shut Classified Systems

In an effort to strengthen its security procedures after classified information made its way to China, the U.S. Energy Department has shut down the classified computer systems at three nuclear weapons labs, except for those "directly involved in the safety and security support" of the labs, a spokesman said.

Awards Target Privacy

Intel Corp. and former White House adviser Ira Magaziner were among those singled out for criticism by a London-based human rights group with its first annual "Orwell Awards." Privacy International bestowed the awards on those it believes have compromised the online privacy of individuals. Computer database marketer Elensys Inc. also received an Orwell for collecting pharmacy records. Magaziner and U.S. Undersecretary of Commerce David Aaron were critiqued for promoting cryptography restrictions and opposing privacy laws. But Magaziner said the charge against him was "flat-out wrong."

Short Takes

YAHOO INC. last week said it fixed a glitch in one of its online stores that inadvertently revealed personal information about customers. . . . Citing fears that the Pentium III's identification feature could help hate groups target gays, the GAY AND LESBIAN ALLIANCE AGAINST DEFAMATION has joined CONSUMER ACTION and the CENTER FOR DEMOCRACY AND TECHNOLOGY in a protest filed against INTEL with the Federal Trade Commission.

TOOLS TO CURB LAPTOP CHAOS

Software helps IT staff upgrade apps remotely, troubleshoot end-user add-ons

BY MATT HAMBLEN

With shipments of laptop computers on the rise, technology managers are scrambling for ways to easily distribute software updates and monitor how users have altered their machines. All the while, they're looking to help ease road warriors' remote connections.

Software products announced last week by Callisto Software Inc. and today by Symantec Corp. should help information technology departments gain some control, analysts and users said.

Callisto's product will allow quick distribution of software upgrades to remote laptops and provide support teams with an inventory of software or hardware added by a user.

And Symantec is aiming to make it easier for help desk workers to quickly set up access codes for road warriors.

Improve Control

Kerry Hotopp, software engineer at Jackson National Life Insurance in East Lansing, Mich., has used Wheaton, Ill.-based Callisto's Orbiter 2.0 on 15 laptops for eight months. Her company will soon deploy Version 3.0 to use its e-mail automatic software distribution feature. "Our goal is to significantly improve our ability to control these laptop machines," Hotopp said.

She said she also wants to use Version 3.0 to give help desk staff a software inventory on any laptop in the field, including software added by a remote user that could contain a virus or otherwise disrupt normal operations, costing time and money to fix.

Gary Bernstein, senior systems manager at Atlantic Richfield Co. in Los Angeles, has been a beta tester of Cupertino, Calif.-based Symantec's Mobile Essentials 2.0. Set to be released in June, the software was designed to allow end users to travel more easily by storing preset calling codes and printer and other peripheral codes for various cities.

Time-Consuming Problems

"I have supported a group of 50 people traveling worldwide, mainly in Asia and South America, and there are so many settings problems, especially for printers, that take time away from work," Bernstein said.

Analysts described the Callisto product as the more important one for helping IT support laptops but said Symantec's release has several enhancements for IT support teams.

Callisto's Orbiter 3.0 sells for $5,000 per server and $150 per client. Symantec Mobile Essentials 2.0 will sell for $69.95.

Symantec and Callisto are small companies in the growing laptop support market, but large companies like Microsoft Corp. are talking about entering the market, said analyst Stephen Drake at International Data Corp. in Framingham, Mass.

MOREONLINE

For resources related to mobile computing and laptop computers, visit our Web site.
www.computerworld.com/more

Correction

A March 29 News story ("Lawsuit Magnet," page 1) incorrectly said Microsoft Corp. hadn't offered to renew a Windows NT license with Bristol Technology Inc.

Microsoft did offer a license last year, but Bristol found it unacceptable.

Study: IT's Telecommuting Express Is Losing Steam

Outsourcing pacts slow trend's growth

BY BARB COLE-GOMOLSKI

Telecommuting continues to be popular among information technology professionals, but the trend is slowing thanks in part to the growth of outsourcing.

According to a survey of 500 companies to be published later this month by Cromwell Foote Partners LLC, a research and consulting firm in Stamford, Conn., 72% of IT departments currently allow some workers to telecommute compared with 68% last year. Prior to this, the telecommuting trend had been on quite a roll, growing by 25% from 1997 to last year.

Telecommuting makes it possible for companies to hire the best talent, regardless of location, and is seen as a way to retain employees.

"We saw big growth, and now we're seeing a leveling off," said David Foote, managing partner at Cromwell Foote. There are two primary reasons — adaptation and outsourcing.

IT departments that embraced telecommuting are now dealing with the cultural and technical issues involved in having employees work at home for a significant part of the week, Foote said.

Charles Grantham, a researcher at the Institute for the Study of Distributed Work in Healdsburg, Calif., said the findings didn't surprise him. The types of IT jobs that are conducive to telecommuting, such as programming and technical support, are now being outsourced in many companies, Grantham said.

For those IT workers who remain, it's a challenge to be separated from the user community, said Cathy Bruno, CIO at Ohio State University Hospitals in Columbus. "I've never been a big supporter of telecommuting because we are pretty hands-on with our customers," she said.

Bruce Freeman, chief technology officer at Burlington Northern & Santa Fe Railroad Corp. in Fort Worth, Texas, said the railroad needs to develop some better processes for managing remote workers before telecommuting becomes widespread there.

Robust Infrastructure

For example, it lacks a system for managing software development among remote developers. A more robust infrastructure would also be required to allow telecommuters to use high-speed connections. In spite of the challenges, IT managers said telecommuting is becoming a key retention tool. Companies will have to figure out how to do this to remain competitive, Foote said.

He recommended that companies create a telecommuting lab away from the core group of workers where individuals can practice telecommuting and get used to their computer equipment. "I also believe that companies should have a technical support group devoted to remote workers," Foote said.

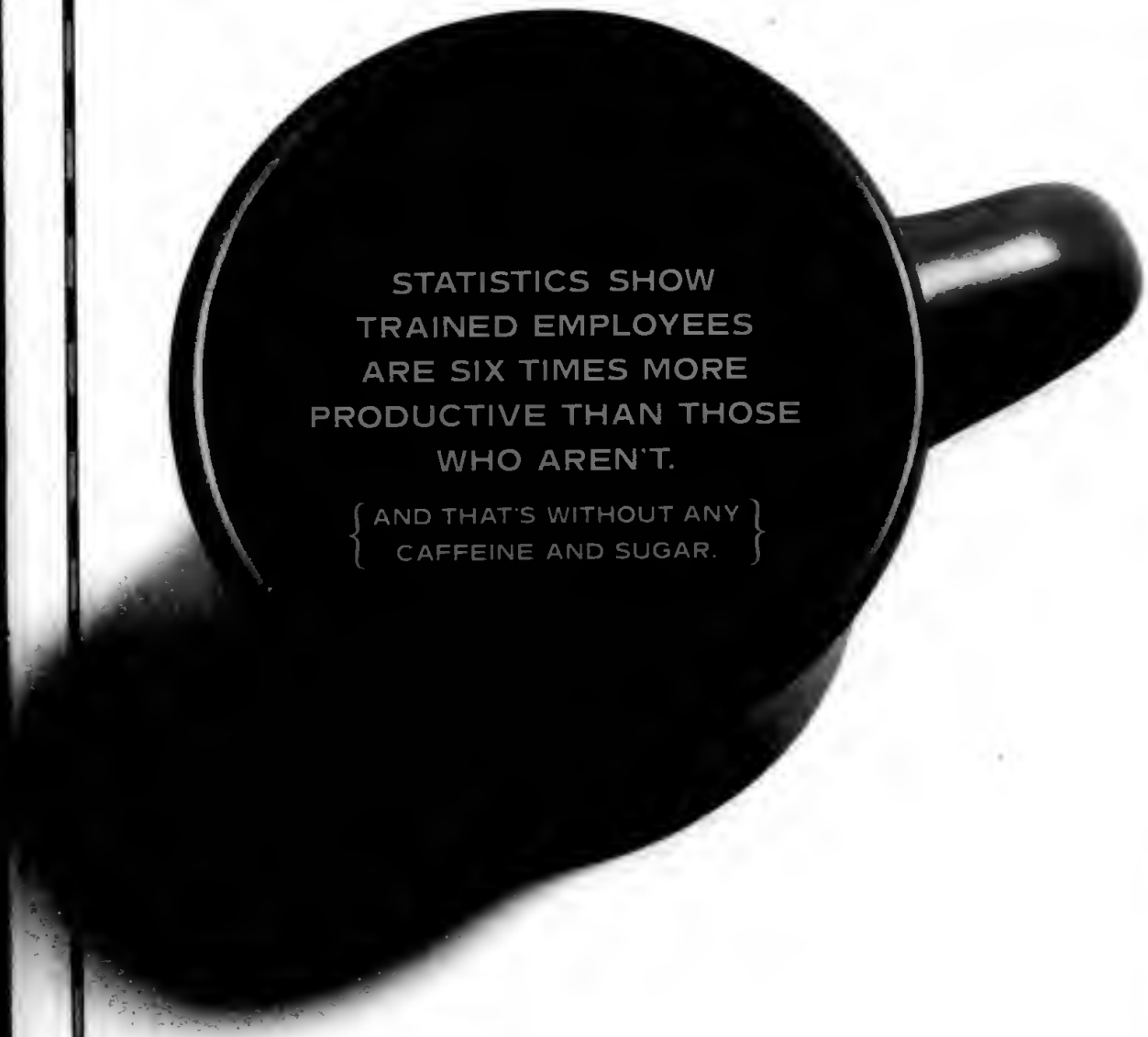
Web Telecommuters?

AGE	FEMALE	MALE
18-24	1,603,000	2,330,000
25-34	2,447,000	3,399,000
35-44	2,369,000	2,564,000
45-49	660,000	1,347,000
50-54	496,000	1,194,000
55+	626,000	522,000
Total	8,201,000	11,356,000

SOURCE: COMMERCENET, PALO ALTO, CALIF.

MOREONLINE

For resources, books, publications, organizations and articles on telecommuting, visit our Web site.
www.computerworld.com/more





According to the Gartner Group, untrained users take six times as long to perform tasks. Multiply that by your staff time to support them, and you can see why our computer training pays for itself in just a few months.

As the world's largest network of authorized training centers, with more than 200 locations around the globe, New Horizons Computer Learning Centers® offer more desktop and technical classes than anyone else. Our professional instructors are rated by every student, every day. And our help desk is available for desktop support 24 hours, 365 days a year.

To see how our guaranteed training can make your employees (and your IT staff) more productive, visit www.newhorizons.com or call **1 800 PC-LEARN** ext. 101 for your free guide.

CHOICES FOR THE REAL WORLD.

New Horizons®
Computer Learning Centers

© 1999 New Horizons Computer Learning Centers. All trademarks are the property of their respective owners.

Microsoft To Update Temp-Worker Policies

BY BARB COLE-GOMOLSKI

Pressured by lawsuits and an organization of temporary workers, Microsoft Corp. last week said it will adopt new staffing policies that were designed to improve conditions for its large constituency of contract workers.

But the move isn't likely to appease a group of temporary workers who are suing the company, claiming they are really employees because they have worked there so long. One of the main points of the suit — that long-term temps should be entitled to stock options — isn't addressed in the new Microsoft policies.

Beginning May 3, Microsoft will increase the number of temporary employment agencies with which it contracts from five to 15, giving temps more flexibility to choose their employers, according to Microsoft spokesman Dan Leach. In the past, temporary workers were often required to sign on with a specific agency if they wanted an assignment at Microsoft. Workers complained that they couldn't choose among agencies and had to remain with a single agency in order to keep their jobs.

A PR Move?

Critics, however, called the step a public relations move. For one thing, "the policy merely suggests that agencies provide benefits, but doesn't require them to," said Mike Blain, co-founder of the Washington Alliance of Technical Workers (Washtech), a Seattle-based group made up largely of Microsoft contractors.

Microsoft employs about 5,000 contract workers — roughly 25% of its overall workforce.

About 60% of those temps have been on the job more than a year, according to a recent survey by Washtech.

As part of the new policies, Microsoft said it will "look more favorably" on agencies that provide paid leave, medical insurance, training and retirement benefits to workers, Leach said. But the company fell short of mandating that temp agencies offer those perks in order to win Microsoft business.

"Our objective is to do business with agencies that offer better benefits to their employees," Leach said. "But we can't tell other companies how to run their businesses."

In a recent Washtech survey of more than 500 Microsoft contract workers, 90% of the respondents said they want to choose the agency they work through.

One Microsoft contractor, Jeff Nachtigal, called the new policies a step in the right direction. But he said he also wants to see "full disclosure of agency bill rates for all [Microsoft] contractors."

MOREONLINE

For resources and articles related to temporary workers, visit our Web site
www.computerworld.com/more

F O C U S '9 9

May 18-20, 1999
Denver, Colorado

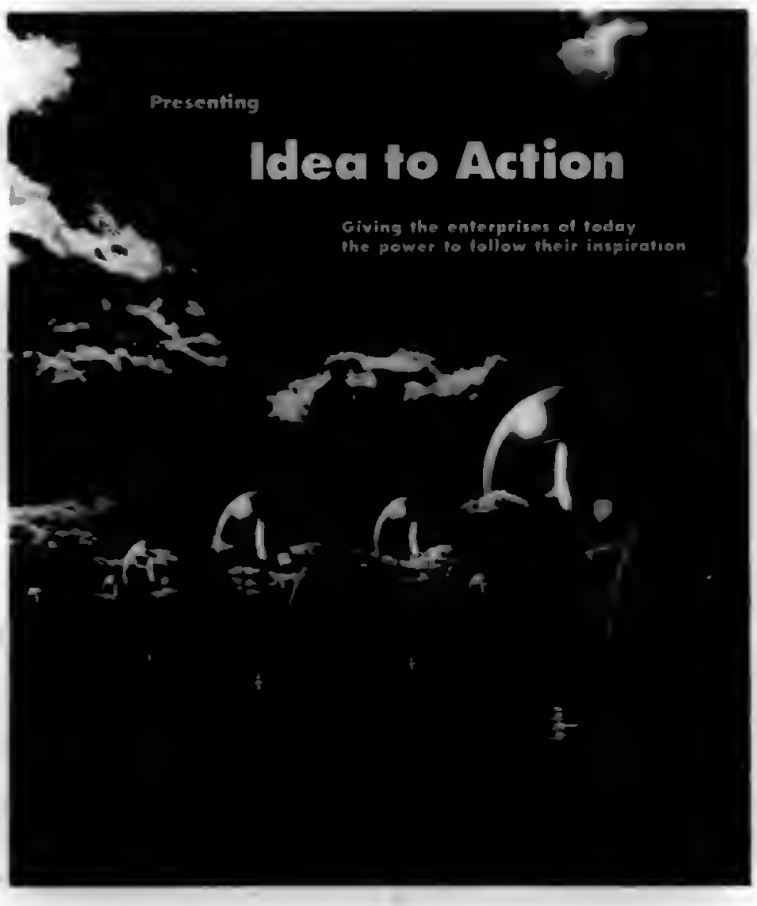
If you saw too many of your career-catapulting ideas die last year because they never got implemented, here's your opportunity to reverse the trend. At FOCUS '99, you'll join more than 5,000 business professionals for an extensive look at how to turn inspiration into reality.

In addition to these distinguished speakers, and a variety of how-to educational sessions, you'll hear how thousands of peers from multiple industries are taking control of their businesses with the help of Idea to Action™ solutions from J.D. Edwards.

So join us along with Jim Hurst, President of Quest, in the key event of 1999. It's the single best place to get the tools and insight needed to *Shape Your World*. For more information, visit www.ideatoaction.com. Then come see us at our Idea to Action Showcase.

Sponsored By
QUEST

JDEdwards
Enterprise Software



Keynote Speakers


Scott McNealy
Chairman, President, CEO
Sun Microsystems


C. Edward McVaney
Co-Founder, Chairman
J.D. Edwards


Douglas S. Massengill
President, CEO
J.D. Edwards


Ray Bradbury
Author


James Earl Jones
Actor

Entertainment


Glenn Frey/Joe Walsh

© J.D. Edwards World Source Company, 1999
J.D. Edwards is a registered trademark of J.D. Edwards & Company



Whose warranty says you'll have one?

Ours. Every new Compaq Deskpro is warranted to be Y2K hardware compliant[1], and the time to celebrate that is right now. Experts say to be Y2K-ready well in advance, and PC replacement (especially at new Compaq Deskpro prices) is the easiest thing to put behind you. Of course, what's ahead matters, too. Every Compaq Deskpro is optimized for the enterprise—not just powerful but manageable (pre-loaded with industry-leading asset management tools), compatible, serviceable and famously reliable. For the reseller nearest you call 1-800-AT-COMPAQ. Visit us at www.compaq.com/happy2K.

intel inside pentium II



Compaq Deskpro Series

COMPAQ DESKPRO EN AT $1,299* INCLUDING MONITOR

- Pentium® II processor 350 MHz
- 4.3 GB SMART II Ultra ATA Hard Drive[2]
- 32 MB RAM
- ATI RAGE PRO TURBO AGP Graphics
- V500 15" (13.8" viewable) monitor
- 3-year limited warranty[1]

COMPAQ Better answers.™

E-Commerce, Messaging Take Center Stage

Oracle to debut 'Message Broker' at Internet World confab

BY CAROL SLIWA

This week's Spring Internet World '99 expo in Los Angeles will bring a hodgepodge of announcements from Oracle Corp., IBM and scores of Web-oriented vendors.

Oracle plans to unveil a new product — code-named "Message Broker" — that promises to help companies exchange business data in an Extensible Markup Language (XML) format.

Message Broker was designed to reliably route XML messages among companies, serving as an "electronic version of a central post office," according to Jeremy Burton, vice president of server marketing at Oracle.

Adapters will take the data from one application system and convert it to XML for routing by Message Broker, Burton said.

The product is intended for companies that need to route high volumes of messages, similar to the way electronic data interchange is used among large corporations, Burtoo said. Oracle plans to work with large vendors to make sure its product interfaces with popular applications, he added.

A beta version of Message Broker is due this summer; the product is expected to ship by year's end. Pricing informatioo wasn't available.

Also this week, Oracle plans to announce an upgrade of its Application Server featuring improved support for a trio of Java specifications — Enterprise JavaBeans 1.0, Java server pages and Java servlets — that help developers build business-critical, server-based applications.

Version 4.0.8 will ship this summer. The cost is expected to remain unchanged at $195 per concurrent user.

IBM plans to announce new electronic-commerce services this week, as well as a software product that will help customers determine the profitability of their Web sites and integrate their electronic-commerce engine with core business systems.

The company declined to provide further details.

Other announcements expected at Internet World '99 include the following:

■ **GEO Interactive** in Woodland Hills, Calif., will introduce Emblaze OnDemand, a tool that will allow companies to provide transparent streaming media to Web site visitors — without plug-ins. Pricing will be $1,995 per domain. It's due to ship next month.

■ **Persistence Software Inc.** in San Mateo, Calif., will announce PowerTier 5 for Enterprise JavaBeans, an upgrade of the company's application server product that will add scalability features.

■ **Accrue Software Inc.** in Sunnyvale, Calif., plans to launch an upgrade to its Insight electronic-business analysis software. Insight 3.0 will let companies track more Web servers, cycle more data storage, drop traffic analysis they no longer care about and schedule ad hoc reports. Pricing will begin at $17,000.

Oracle8i Sales Push to Begin

User group wants to hear about benefits

BY STEWART DECK

Oracle Corp. database users have three things foremost in their minds this week: the new Oracle8i database, Oracle's plans for data warehouse integration tools and how Oracle will help them better plan for Internet projects.

When Ken Jacobs, Oracle vice president of data server marketing, and Ray Lane, Oracle president and chief operating officer, appear before the International Oracle Users Group Americas (IOUGA) Wednesday in Denver, they should be prepared for questions on why users should upgrade to the new, Internet-tooled Oracle8i database.

"People want to see bow 8i works, how the function-level indexing works and what its benefits are," said Richard Niemiec, a Lombard, Ill.-based consultant and executive vice president of IOUGA. "People come to this conference to see whether it's time to move to the latest version and see what it takes to do that."

Donna McConnell, a data specialist at The Detroit Edison Co. in Detroit, said she has seen plenty of 8i demonstrations. Now she would like to directly hear of the experiences of some of the early users of the new editioo.

McConnell said users will also be interested in hearing more about Oracle's plans for more tightly integrating its data warehousing products [CW, Nov. 2].

"People are still looking for ways to integrate their warehousing efforts with other enterprise developments and how to archive all that info and use it," she said.

What's Your Bottom Line?

Niemiec said users want to deploy intranets and other Internet projects with their companies' business partners.

"Both of these [kinds of projects] are data-intensive, so people will be attending sessions and listening for how to best deal with that," he said.

But some see it differently.

"The only way Oracle will get their installed base of users lock, stock and barrel to heavily adopt and upgrade to 8i is through some sort of financial incentive," said Michael Abbey, an Ottawa-based consultant and IOUGA board member.

Y2K A TOUGH CLIMB FOR ORACLE ERP USERS

Release 10.7 not fully compliant; users face migrations or application patch-ups

BY CRAIG STEDMAN

USERS OF Oracle Corp.'s ERP applications are making their systems year 2000-compliant by installing new releases. But for many, that hasn't been easy.

Take The Christian Science Publishing Society. To solve its year 2000 problems, the Boston-based newspaper publisher next week plans to finish a crash, six-week upgrade to the newest versioo of the financial applications in Oracle's enterprise resource planning (ERP) suite.

That wasn't what the society had in mind last June when it installed Oracle's 10.7 software — which, like the new Release 11, was supposed to be able to handle year 2000 date changes.

But two months ago, the society got a splash of cold water from Oracle consultants who were called in to examine its system. They handed over a list of about 60 year 2000-related software patches that had to be added to the applications.

"When it comes down to it, you can't buy 10.7 out of the box and be Y2K-compliant," said Ray Wallett, applications project manager at the publishing society. "It's ready to be compliant, but it's not compliant. And that's a fine difference."

Instead of patching, Wallett said, the society jumped to Release 11 — an upgrade free of year 2000 patches but one that required a fast switch from its Windows-based, client/server setup to three-tiered Web applications. Several other users said they also faced heavy patching to get 10.7 set for year 2000 but decided upgrading to Release 11 was too big a change to make at the same time as a year 2000 fix.

For example, after upgrading to 10.7 last year, Watkins-Johnson Co. "realized immediately ... that Y2K problems persisted" in the software, said Joe Dorsey, manager of informatioo systems at the maker of wireless communications products and semiconductor production equipment.

But switching to Release 11 would have required a database upgrade and the retraining of end users who are still using Oracle's character-mode screens, Dorsey said. Watkins-Johnson added more than a dozen patches to 10.7, some "as large as minor upgrades," he said. Included were two custom patches developed by Oracle for Watkins-Johnson and several application scripts that the Palo Alto, Calif., company wrote itself. Final testing is due to be finished this month.

Year 2000 migrations are expected to be a bot topic at next week's spring conference of the independent Oracle Applications Users Group (OAUG) in Sao Diego. But an OAUG official defended Oracle, saying it "has been very open and proactive" about the need for patching Release 10.7.

Ron Wohl, senior vice presideot of applications development at Oracle, said it put a high priority on "communicating everything that customers have to do" to become year 2000-compliant.

JUST THE FACTS

Oracle Offers Y2K ERP Fix

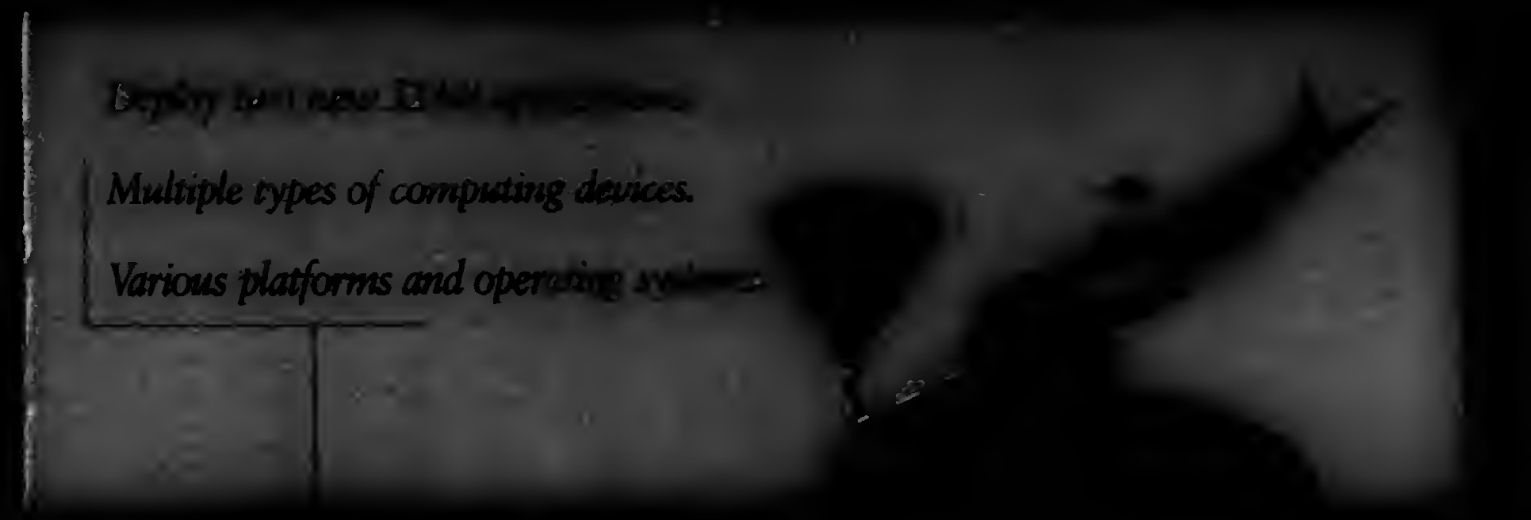
What users have to do: Install or upgrade to one of the two most recent releases of Oracle's ERP applications.

The challenges they face: Release 10.7 requires the installation of software patches. Release 11 requires a switch to Web-based applications.

Feedback from users: The patchns can complicate upgrades, but Oracle has been open about that with customers; the patches appear to work.

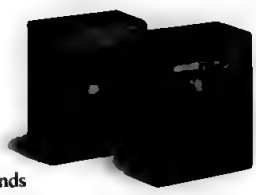
MOREONLINE

For Oracle resources, publications, user groups and articles, visit our Web site.
www.computerworld.com/more



It's possible.

Citrix server-based computing solutions can extend access to Windows-based applications for your various devices in less time than ever before.



Citrix® WinFrame®, and MetaFrame™ for Microsoft® Terminal Server, have enabled thousands of companies like yours to leverage their existing hardware investments and deliver cost-effective access to the latest Windows®-based applications for an increasingly diverse—and growing—user base.

Deliver high-performance application access to the latest Windows and non-Windows devices.

With Citrix, you can use virtually any device to access vital applications, including x86- and Pentium®-based PCs, Windows-based terminals, network computers, wireless devices and information appliances, as well as DOS®, UNIX®, OS/2® Warp, Mac® OS and Java™ clients. Plus, Citrix works over existing network connections (WAN, broadband, wireless, Internet/Intranet) and protocols (TCP/IP, IPX, SPX, NetBIOS®, Direct Asynch.) so you can avoid expensive network upgrades.

Ensure users have full access to the resources they need to be successful.

WinFrame and MetaFrame enable administrators to extend applications to users anywhere with just a browser. Plus, remote users are able to use their local resources to copy, print or save vital information.

See what 77% of Fortune 100 companies already know—Citrix works!

Discover how thousands of leading companies are making the impossible possible and extending business-critical application access to more users and devices with Citrix WinFrame and MetaFrame.

To learn more about how Citrix can help you, call 888-564-7630 or visit us on the Web at www.citrix.com/drive1 for a FREE Test Drive CD-ROM.

CITRIX®

© Copyright 1998-1998, Citrix Systems, Inc. All rights reserved. Citrix and WinFrame are registered trademarks, and MetaFrame is a trademark of Citrix Systems, Inc. Microsoft is a registered trademark of Microsoft Corporation. All other products and services are trademarks or service marks of their respective companies. Technical specifications and availability are subject to change without prior notice. Made in the U.S.A.

BRIEFS

Utilities Test Y2K Communications

Power plant operators will spend this week sifting through results of the first nationwide year 2000 test of utility companies' backup communications. Utilities have identified voice and data communications systems – which are used to remotely operate and monitor plant equipment – as their highest year 2000 contingency planning priority.

Microsoft Shows Off Embedded NT

Microsoft Corp. last week showed off Embedded NT, an operating system designed for higher-end devices than those that would use Windows CE, another of Microsoft's embedded platforms. It's due by year's end.

More Exec Changes Hit PeopleSoft

PeopleSoft Inc., hit by flattening sales of its applications, last week announced several management changes. In one move, the Pleasanton, Calif., company hired Michael Gioja, former head of human resources product development at rival SAP AG, as senior vice president of development. In another, Rick Bergquist, who had been vice president of technology, will now work on long-term software strategy as chief technology officer.

Short Takes

MAZDA NORTH AMERICAN OPERATIONS this week will announce plans to use EGAIN COMMUNICATIONS CORP.'s eGain Hosted Network to link online shoppers and more than 500 dealers via the Internet. . . . ELIASSEN GROUP INC., an information technology services company, has formed a permanent staffing division. . . . HEWLETT-PACKARD CO.'s workstation users will be able to custom-configure their systems with last week's introduction of the latest HP Visualize workstations. . . . MARKOSTICS GROUP INC. last week reported its fourth straight quarterly loss. The company lost $71.2 million in the three months ended Feb. 28.

VOLUNTEERS SOUGHT TO AID Y2K EFFORTS

Groups organizing to provide IT pros to assist in communities and overseas

BY PATRICK THIBODEAU

As THE deadline approaches, the need for IT professionals to provide year 2000 expertise — especially overseas — is growing, experts say.

One effort to tap the skills of corporate and government information technology workers was launched last week. The Y2K Expert Service Corps (YES Corps), part of a year 2000 cooperation project sponsored by the United Nations and World Bank, is seeking volunteers who can spend a few hours each week assisting year 2000 efforts via e-mail and videoconferencing — and even by traveling overseas.



PATRICK THIBODEAU

BRUCE McCONNELL: Creating response plans is a priority

"The idea is to supply this expertise in the fastest way possible," said Howard Rubin, an organizer and chairman of the department of computer science at Hunter College in New York. The group isn't offering incentives to companies to free up workers.

With the deadline fast approaching, the international effort will likely assist countries in responding to potential failures and in creating contingency and response plans, said Bruce McConnell, who heads the International Y2K Cooperation Center, the group that's sponsoring the volunteer effort.

IT professionals are also needed to help in their hometowns, especially where "local government does not have Y2K as their priority," said John Koskinen, chairman of the President's Council on Year 2000 Conversion.



PATRICK THIBODEAU

HOWARD RUBIN aims to "supply this expertise in the fastest way"

The council next month plans to start Community Conversations, forums on the year 2000 problem. Koskinen urged IT professionals "to take a leadership role in encouraging and organizing them."

Some IT professionals have already stepped up to the plate. Chris Apgar, year 2000 project manager at Providence Health Plan in Beaverton, Ore., has been speaking to local, state and national groups on year 2000 issues.

"What's needed is a community awareness approach where people can get valid information," he said. "My biggest concern is we are going to find panic."

IT administrators at Cleveland-based Medical Mutual of Ohio have long provided advice to local nonprofit agencies on systems work, said Andy Balazs, vice president of information systems and services at the firm. "It's part of our responsibility," he said.

But Balazs said it may be too late to help local agencies in their year 2000 work.

For more information on YES Corps, visit *www.iy2kcc.org.*

MORE THIS ISSUE
For more Y2K news, **see page 48.**

FAA Defends Performance Of Traffic Control System

BY STACY COLLETT

The Federal Aviation Administration is crying foul over reports its new air traffic control system is underperforming.

Published reports last week said the $2.2 billion Standard Terminal Automation Replacement System (STARS) is two to three times slower than the old system in displaying aircraft radar positions and responding to air traffic controllers' commands.

FAA spokesman Bill Shumann conceded the report is accurate, but he said the full STARS system wasn't being tested. A makeshift version of the system, called STARS early display configuration (EDC), is the culprit, he said. STARS EDC links workstations and color displays with the old Automated Radar Terminal System, Shumann said.

He said the system underperformed in the test because air traffic controllers, who complained about outdated systems in 1997, requested software changes that slowed the system.

The FAA is working with lead contractor Raytheon Co. in Lexington, Mass., to correct the problems. Raytheon said the STARS system performs 100% to FAA specifications.

The full system is slated for rollout at less-busy airports by year's end and to 173 air traffic control facilities by 2005.

The criticized system is a backup, said Mike McNally, president of the National Air Traffic Controllers Association in Washington. "The full service level of STARS is a different configuration, and we still have to do a lot of work with the computing human interface around that," he said.

D.C. Notes: Microsoft Seeks Board Seat

BY PATRICK THIBODEAU
WASHINGTON

■ Microsoft Corp.'s chief operating officer, Bob Herbold, is campaigning again for a board seat on the Software & Information Industry Association (SIIA), a group that has recommended breaking up his company. Herbold failed last year to win a seat on the board of the Software Publishers Association, just before it merged with the Information Industry Association to create the SIIA.

The SIIA's board sent the Department of Justice a report earlier this year recommending that the company break up into a collection of so-called "Baby Bills." The group has about 1,400 members.

■ The President's Council on Year 2000 Conversion recently said that 92% of the federal government's mission-critical systems had met the March 31 year 2000 compliance deadline.

But federal agencies may be cooking the books to bring their systems up to compliance. In August 1997, federal agencies reported 8,562 mission-critical systems, according to the Office of Management and Budget (OMB). Last month, the OMB reported that federal agencies were now counting 6,399 mission-critical systems, a 25% decrease. The latest report isn't likely to curb attacks in Congress over federal year 2000 efforts.

■ Congress is being asked to approve a bill that would set a national legal standard for digital signatures. The Millennium Digital Commerce Act, authored by Rep. Anna Eshoo (D-Calif.), will go to the House Commerce Committee for a hearing yet to be scheduled.

The bill doesn't require businesses to use a particular type of electronic signature technology. The states have been drafting their own legal standard, but that isn't expected until October. The intent of Eshoo's legislation is to speed up the process by arriving at a consensus in Congress, said Kevin Geary, a spokesman for the congresswoman.

IF YOUR BUSINESS' NEEDS EXCEED
THAT OF YOUR INTERNET SERVICE, THERE ARE
ALWAYS OTHER WAYS OF COMMUNICATING.



UUNET

MICROSOFT MULLS OPEN NT CODE

Users excited about possibility, but they doubt it will happen

BY SHARON GAUDIN
LOS ANGELES

MICROSOFT Corp. is mulling making its Windows NT source code openly available, company President Steve Ballmer said last week. That possibility has users and analysts pleased, if skeptical.

Ballmer and Brian Valentine, vice president of Microsoft's Windows operating system division, told attendees at the Windows Hardware Engineering Conference here last week that the company may make the code available to corporate and commercial developers.

That means corporate and third-party developers would have open and easy access to NT code, enabling them to either better customize applications or build applications with the code. Third-party developers would be able to produce more software, and companies would be able to customize applications.

As it stands now, Microsoft is very particular about which industry vendors may see its code. And anyone receiving it has to dig deep into his pockets to do so.

"The real benefit [of access to Microsoft source code] would come from the applications we could get from software vendors," said Terry Beavers, technology assessment specialist at Tampa, Fla.-based University of South Florida, which has 46,000 users. "If you could see the source code, it would make it so much easier to develop software applications that integrate easily with the [operating system]. That would make my life easier."

But Beavers said he's hesitant to believe that Microsoft would actually open up the code for Windows 2000. "I'd be very surprised if they would release that so early in the product cycle for Windows 2000," he added.

But Eric Morton, technical adviser to First Union National Bank in Charlotte, N.C., said corporate buyers would have to be careful with software built off the code if it's opened up. "One little change could cause thousands of problems," he said.

The news of Microsoft even considering open sourcing comes after years of users and developers asking for just that.

And industry watchers said the switch in attitude may have several triggers, ranging from Microsoft's antitrust battle with the Justice Department to the momentum behind the Linux operating system.

"Novell said they were opening up the code for NetWare just a few weeks ago. It's clearly a trend in the industry that Microsoft doesn't want to be left out of," said Laura DiDio, an analyst at Giga Information Group Inc. in Boston.

Continued from page 1

Windows 9x

grade to Windows 98 would hold off that move for a while."

But some industry watchers said that would be a bad road to take because adoption would only mean one more migration to a platform that isn't built for business. Steve Kleynhans, vice president of computing strategies at Meta Group Inc. in Stamford, Conn., said corporate users who would give the proposed Windows 9x desktop upgrade a second look aren't "thinking very straight."

"Corporate users didn't move to Windows 98 in droves, so why would they do that with this [upgrade]?" Kleynhans asked. "Windows 95 and 98 are not reliable or stable. There's real issues with Microsoft's DOS-based products. It just makes more sense for companies to move straight to NT."

Shipping News

Windows 2000, the upgrade to Windows NT 4.0, is expected to ship this fall. Microsoft last week confirmed that it has set an internal target date of Oct. 6 for final shipment. The third beta release is expected by the end of this month [CW, April 5].

The Windows 98 upgrade is slated to ship next year, with no specific target date. Microsoft President Steve Ballmer told an audience of thousands of hardware vendors and analysts last week at the company's eighth annual Windows Hardware Engineering Conference here that the unnamed new desktop operating system will be based on the Windows 9x code base.

Year 2000-Compliant

It's being geared to support Universal Plug and Play and home networking and to handle digital media. It's also supposed to be year 2000-compliant.

Even before Windows 98 hit the market last year, Microsoft said it would be the last member of the Windows 9x dynasty. The company said its next desktop operating system — whether corporate or consumer — would be based on the NT kernel. Indeed, Microsoft executives said at the time that they wanted to focus all of their development efforts on the NT platform.

Kleynhans said the fact that Microsoft has been visibly struggling to get Windows 2000 out the door has affected its ability to take the Windows 2000 workstation and trim off some of its business capabilities for a consumer version.

"Windows 2000 has turned into a much more difficult proposition than they had imagined," Kleynhans said. "They can't afford to not have another product for the consumer space in the time it would take them to come up with one based on Windows 2000." But Eric Morton, a technical adviser at Charlotte, N.C.-based First Union Corp., the country's sixth-largest bank, with assets of $280 billion, said he may have to wait for Windows 2000. And he said he's not going to consider bringing in an interim upgrade.

"The bank has steered away from Windows 98," said Morton, who plans to move to Windows 2000 on both the desktop and server. "We're moving to the NT kernel. Windows 95 and 98 aren't stable. I don't like them, and I can't imagine that an upgrade to them would be any different."

BMC Packages Monitor NT Servers, BackOffice Apps

Software automates manual tasks, boosts reliability of NT servers, observers say

BY BOB WALLACE

BMC Software Inc. last week announced software that can let companies trim or redirect staff by providing full-time monitoring and management of Microsoft Corp. Windows NT Server and BackOffice applications.

That management function is key because it automates an inefficient and staff-intensive task while boosting server and application availability — an important factor as companies deploy corporate applications on NT servers.

BMC unveiled Patrol for Windows NT Server; NT Server, Enterprise Edition; NT Server, Terminal Server Edition; and Patrol software for Microsoft BackOffice Server, which covers applications such as Exchange.

"These products are very important because Windows NT servers demand a lot of attention, and applications running on them are spreading throughout corporations and increasing in importance," said Patrick Dryden, an analyst at Giga Information Group Inc., a Cambridge, Mass., consulting and research firm.

PRODUCT	AVAILABILITY
Patrol for Windows NT Server*	Now
Patrol for BackOffice Server	Next month
Patrol for NT Server, Enterprise Edition	By end of Q2
Patrol for NT Server, Terminal Server Edition	By end of Q2

Help on the Way

Users install the BMC Patrol software on their servers, set performance levels and specify whether they want to be alerted via e-mail, pager or both when performance slides or falls below preset levels. The Patrol software can also be programmed to automatically take corrective action when problems arise, such as a crashed server.

Curtis Shelton, manager of data center operations at IMS Health in Atlanta, said his company used to have data center staff check all servers hourly and take corrective action if they weren't running efficiently.

"Patrol for Windows NT Server does all that for me. [Before] if any of the servers failed five minutes after being checked, we're talking about a lot of downtime," Shelton said.

The BMC package has helped Shelton halve data center operator staff from 16 to eight people, he added.

The new BMC Patrol packages will compete with products from Computer Associates International Inc., Tivoli Systems Inc. and many small companies, said Richard Ptak, an analyst at Hurwitz Group Inc. in Framingham, Mass.

Are you ready for the new customer?



Plan accordingly.

There are two critical dynamics to understand about today's customer. One, nobody has any time. Two, they expect every company to be on the Web. They want it all online—product information, pricing, support, anything that will save them time and money. Sure, relationships are still built on trust, commitment and support. But for this new breed of empowered customer, this **e-customer**, they're based on the Web

While **e-customers** present endless opportunity, they do pose some challenges. Managing relationships with customers, prospects and partners online is an enterprise-wide task. Systems performance and scalability needs are key. In short, it's got to be done right. Shrink-wrapped solutions will fall short. Experienced partners with customizable products and old-fashioned follow-through will succeed.

This is where Vantive clicks in. A leader in customer interaction software since 1990, Vantive extends your front-office out of the office. And onto the Web. So all your customer communications—phone, fax and Web—can work together. It's a fully scalable, Web-powered platform using reliable and proven technology that can handle hundreds or millions of customers. **E-customers** are here to stay. Vantive is how you manage them.

www.vantive.com
1-800-VANTIVE

vantive
the e-customer company

YOU WANT TOP PERFORMANCE

YOU DON'T WANT TO PAY TOP DOLLAR

IT'S CALLED BEING SMART.



www.xerox.com



AT 40 PAGES PER MINUTE, THE XEROX DOCUPRINT N40 NETWORK PRINTER IS 25% FASTER THAN THE FASTEST HP LASERJET PRINTER, AT A VERY COMPETITIVE PRICE. WE CALL THAT BRILLIANT.

KEEP THE CONVERSATION GOING. SHARE THE KNOWLEDGE.

THE DOCUMENT COMPANY

SILICON VALLEY SPLITS ITS POLITICAL SUPPORT

Both Gore and Bush line up backers as region debates who's best for high-tech

BY PATRICK THIBODEAU

SILICON VALLEY'S Democrat-friendly reputation is being challenged by a large number of high-tech executives who say Republican policies favor high-tech growth.

A group of 50 executives signed their names last week to a newspaper advertisement urging Texas Gov. George W. Bush to run for president. The advertisement ran the same week Vice President Al Gore attended a Silicon Valley fundraiser that took in $400,000 from nearly 350 people.

"The Republican view of less government is good for Silicon Valley," said Floyd Kvamme, a partner at the venture capital firm Kleiner Perkins Caufield & Byers in Palo Alto, Calif., and one of the letter's signers. "Regulating of our industry is something we would prefer not to happen."

But Janina Pawlowski, the co-founder of the online home mortgage provider E-Loan Inc. in Dublin, Calif., and an organizer of the Gore fund-raiser, said the Democratic administration has produced "incredible growth — Internet commerce has blossomed."

"Silicon Valley executives can be incredibly self-centered — they forget about social issues, and they focus on their maybe one issue," she said.

But what may be most true about Silicon Valley is this: There's no uniform opinion.

Kvamme's partner at Kleiner Perkins, John Doerr, is helping Gore. Jim Barksdale, the former CEO of Netscape Communications Corp., signed the advertisement backing Bush. But Netscape co-founder Marc Andreessen is aiding Gore.

The reputation that Silicon Valley favors Democrats may have more to do with the organizing efforts of that party in earlier elections. The Republicans are now playing catch-up, observers said.

Silicon Valley's potential for campaign cash, along with the political cachet that comes with backing of executives who head those fast-growing companies, makes the support of high-tech executives critical.

"Both sides are racing to get on their good side," said Holly Bailey, a researcher at the Center for Responsive Politics, a Washington-based group that tracks campaign finance spending.

The first real indication of success will come this week, when the candidates are required to file campaign finance statements with the Federal Elections Commission detailing the amount of money they have raised since Jan. 1.



SOME OF SILICON VALLEY'S high-tech elite are asking Gov. George W. Bush to run for president

Republicans' public priorities are many of the same issues that have already been argued about in Coogress: year 2000 liability-limiting legislation, increases in the annual cap on the number of high-tech workers allowed into tbe U.S., encryption and especially education to improve the high-tech workforce.

Democrats say the belief that Republicans are less apt to regulate isn't true. Consider the GOP-backed Communications Decency Act, said Wade Randlett, a political director at the bipartisan Technology Network in Palo Alto. "I don't think you can point to any Democrats in Congress who are trying to regulate the Internet."

MORE

As Silicon Valley takes sides behind George W. Bush and Al Gore it's setting the stage to become a political force, writes Galen Gruman **See page 32.**

Wal-Mart, Amazon.com Settle Suit On Hires

Some workers' duties to be limited

BY BARB COLE-GOMOLSKI

Observers said last week's settlement of a trade-secrets dispute involving Wal-Mart Stores Inc., Amazon.com Inc. and Drugstore.com Inc. could make firms more cautious about protecting their proprietary information systems.

According to the settlement, Amazon.com and Drugstore.com will reassign one former Wal-Mart employee and restrict the duties of eight others for one year so that the individuals do work unrelated to their old jobs at Wal-Mart.

The defendants also agreed not to contact Wal-Mart employees about jobs, but they may still hire them if the workers make the first contact. Neither side will pay damages.

Bentonville, Ark.-based Wal-Mart sued the online retailers in October and again in January, alleging violations of trade-secret laws when Amazon.com and Drugstore.com hired 15 former Wal-Mart employees who worked with the discount retailer's data warehousing and merchandising systems. Amazon.com countersued Wal-Mart in February.

Though a Wal-Mart spokesman said that "the terms of the agreement provide us with the assurances of confidentiality we were seeking," the agreement fell short of the injunction Wal-Mart had sought.

"I don't see what Amazon is giving up," said Kenneth Dort, a partner at Gordon & Glickson PC, a Chicago law firm. Dort said cases like this are hard to prove because the plaintiff has to show that "there was malevolent intent" involved when the company hired the employees involved.

The case shows that in the age of electrooic commerce, the intellectual assets of a company should be protected, Dort said. He noted that Wal-Mart didn't have noncompete agreements with those who were hired by Amazon.com.

But protecting those assets can be tricky, said Jeff Scherb, chief technology officer at The Tribune Cos. in Chicago. Some employees are put off by noncompete agreements, and the documents don't always hold up in court, Scherb said.

Recruitment Raids or Fair Game?

Some well-known companies have sued over alleged predatory hiring practices of IT staff

COMPANIES	BASIS OF SUIT	STATUS
Wal-Mart vs. Amazon.com	Wal-Mart claimed that 15 members of its IT staff with deep knowledge of key Wal-Mart systems were targeted by the online bookseller and its associates.	Settled out of court last week
Motorola vs. Intel	Motorola says Intel hired 15 Motorola chip designers in an attempt to garner trade secrets.	Pending (filed March 11)
Borland vs. Microsoft	In 1996, Borland sued Microsoft for hiring 34 of its programmers and managers over two years.	Settled out of court; terms not disclosed

EU, U.S. Edge Toward Data Privacy Pact

BY ELIZABETH DE BONY

European Commission and U.S. officials last week said they are confident they will reach an agreement on data privacy in time for a June 21 summit in Washington.

John Mogg, director general of the European Commissioo's internal market division, said he is confident the talks would succeed in time for the oext trans-Atlantic summit.

At issue is an Oct. 25 European Uoion directive on data privacy that gives individuals the right to limit the use of personal data. The directive could also require member states to block data transmissions to nations without strict privacy rules.

De Bony writes for the IDG News Service in Brussels.

Graphics will scream.
Networks will hum. Users will just

sing

your praises.



STARTING @ $3,395

Introducing the new line of Silicon Graphics® visual workstations for Windows NT®. Featuring our Integrated Visual Computing (IVC) architecture with the Cobalt™ graphics chipset, these machines deliver breakthrough graphics performance and offer seamless integration into NT, Mac® and Unix® environments. They're also SNMP and DMI 2.0 compliant and come bundled with Intel® LANDesk® Client Manager—allowing easy desktop management throughout your enterprise. What's more, every system includes advanced integrated features such as 10/100 Ethernet, IEEE-1394, USB and professional video I/O, enabling hassle-free installation and support. And the price? Less than you would expect. The Silicon Graphics 320™ workstation starts at just $3,395.

Or choose the Silicon Graphics 540™ workstation.** Starting at only $5,995 and supporting up to four Intel® Pentium® II Xeon™ processors, it's the most scalable Windows NT workstation around. Whichever you choose, it'll be music to your ears.

intel inside pentium II

Silicon Graphics 320 Visual Workstation

- *Silicon Graphics Integrated Visual Computing architecture with Cobalt graphics chipset*
- *Supports up to two Intel® Pentium® II processors (up to 450MHz)*
- *Silicon Graphics Interoperability Toolkit™ bundled free with every system*
- *Ultra ATA or optional Ultra2 SCSI drives up to 28GB total capacity*
- *Microsoft® Windows NT® Workstation 4.0*
- *Add the SuperWide™ 17.3" Silicon Graphics 1600SW™ digital flat panel monitor (shown) for only $2,495*

SiliconGraphics

To get information, find a local reseller or to order, call **1 888 SGI-3548** or visit us at **www.sgi.com/go/visual**

*Requires additional software under Windows NT Workstation 4.0. **For information on the 1999 availability of the Silicon Graphics 540 workstation, please call 1 888 SGI-3548. Bundled free with every system: Windows NT Workstation 4.0 with SP, Hummingbird Maestro Solo and Telnet Daemon, Equilibrium Debabelizer Pro 4.5.2 (Light Edition), Medical Production MacDent 98, McAfee Virus Scan and Web Scan and Intel LANDesk Client Manager (LDCM v5.5). Prices quoted are for U.S. only.*

© 1998 Silicon Graphics, Inc. All rights reserved. Silicon Graphics is a registered trademark, and the Silicon Graphics logo, Silicon Graphics 320, Silicon Graphics 540, Cobalt, SuperWide and Silicon Graphics 1600SW are trademarks, of Silicon Graphics, Inc. Intel, the Intel Inside logo, Pentium and LANDesk are registered trademarks, and Pentium II Xeon is a trademark, of Intel Corporation. Microsoft, Windows and Windows NT are registered trademarks of Microsoft Corporation. All other trademarks are property of their respective owners.



WINDOWS® 20

Microsoft Windows NT Workstation 4.0 is now available with Service Pack 4, which includes Y2K and Euro updates. For Year 2000 information regarding Microsoft products see www.microsoft.com/year2000/

© 1998 Microsoft Corporation. All rights reserved. Microsoft, Windows, the Windows logo, Windows NT and Where do you want to go today? are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

You know changes are coming.
Shouldn't your PCs know it too?

00 *READY* PCs

If you buy a new PC now, it should be ready to run the next-generation desktop OS, Microsoft® Windows® 2000 Professional. Well that's the whole idea behind **WINDOWS 2000 *READY* PCs**. They've got the RAM. They've got the power. And they've got Windows NT® Workstation 4.0 (including Y2K updates)—which means you've got performance, reliability, and low support costs now, plus the easiest possible upgrade path when the time comes. So with one decision, you're cleverly preparing your desktops for the future. For information on hardware partners and products, please visit our Web site.

***READY* WITH WINDOWS NT® WORKSTATION 4.0**
***READY* WITH 300 MHz OR MORE**
***READY* WITH 64 MB OF RAM OR MORE**

www.microsoft.com/WINDOWS2000/*READY*/

Microsoft®

Where do you want to go today?

E-BROKERS' SNAFUS PROVIDE LESSONS

Online retailing calls for beefed-up IT, strong customer service

BY STACY COLLETT

When online retailers look to the cutting edge of electronic commerce, they look to online brokerage firms. But lately, that view hasn't been pretty.

Schwab.com suffered four server outages in two months. ETrade Group Inc.'s stock prices were cut in half after its Web site shut out traders and investors for less than two hours. And the Securities and Exchange Commission reported a 330% increase in complaints concerning online investing [CW, Feb. 8]. But industry observers and online executives said there are lessons learned that can benefit any online business. Among them are the following:

■ Gauge your tolerance for outages – and add redundant systems accordingly. It's easy to get caught up in an endless cycle of upgrades and migration to handle increasing online traffic. But companies have to weigh their tolerance for system failures against the money they're willing to spend on redundant systems.

"Most of the time, that [redundant] technology sits idle for long periods of time," said Octavio Marenzi, an analyst at Meridien Research Inc. in Newton, Mass. "But what's the reduced risk worth to you?"

Schwab.com had one 90-minute outage in February while workers installed a third mainframe to handle Schwab's increasing volume of traders. Officials said they can make only incremental fixes right now. "One hundred percent [reliability] is not here [and won't be] in the next year or two," said one online industry executive who asked not to be identified.

■ Electronic commerce requires more customer service, not less. Online brokers are integrating online technology with human interaction. When Schwab systems go down, for example, investors can alternatively make trades by phone or go directly to a Schwab brand office.

"They will increase the use of brokers — from both a failover technology perspective and from a relationship standpoint," said Larry Tabb, an analyst at The Tower Group in Needham, Mass.

■ Consider a risk-management plan. Many banks have instituted risk management plans to minimize the affect of system outages on customers. When a bank's back-office system is down, automated teller machines often distribute cash "on good faith," without checking a customer's balance (banks will charge penalties for any overdrafts). Some observers said such a plan should be considered by the online trade industry, but others expressed doubts.

"It's possible, but it shifts a high amount of risk to the broker," who would have to account for changes in a stock's price after fixing a system outage, said David Baltaxe, an analyst at Current Analysis Inc. in Sterling, Va.

Risk management could work well for online catalogs or booksellers, he said.

■ If you can't stand the heat, outsource. Online industry observers said many companies are turning to outsourcing rather than running their own electronic-commerce operations.

"People are expecting too much [from companies with online retail offering], especially when you're not a technologist. [Some companies] don't have the money or desire to handle this stuff in house," Baltaxe said.

Help Desk Org on Upswing?

HDI founder returns to attempt comeback

BY JULIA KING

The beleaguered Help Desk Institute (HDI) is back in the hands of its original founder, Ron Muns. But restoring the association's shine will still be no easy task, users said.

Last month, Muns bought back HDI for an undisclosed sum from Ziff-Davis Corp., to which he had sold the 4,000-member association back in 1992.

The buyback came after bitter complaining by HDI members who had grown increasingly disenchanted with the group under Ziff-Davis.

In the meantime, two new groups have formed in an attempt to replace HDI as the premier professional association for help desk workers [CW, Feb. 15].

Atlanta-based Help Desk 2000, which offers education and certification programs, is headed by Pete McGarrahan, a well-known industry expert who Ziff fired as HDI's executive director last October.

The other new group, Help Desk Professionals Association (HDPA), is headed by Ivy Meadors, a help desk consultant who described the nonprofit HDPA as "an e-commerce-based virtual business."

Help for Helpers

A look at three help desk groups:

HELP DESK 2000
Location: Atlanta
URL: *www.helpdesk2000.org*
Annual dues: $495 to $1,795

HELP DESK PROFESSIONALS ASSOCIATION
Location: Redmond, Wash.
URL: *www.hdpa.org*
Annual dues: $175 to $475

HELP DESK INSTITUTE
Location: Colorado Springs
URL: *www.helpdeskinst.com*
Annual dues: $275 to $495

Among other things, HDPA members will receive online access to a database of best practices information plus news about industry trends.

Muns acknowledged that "for whatever reason, [HDI] was not treated as a priority for Ziff. I was disappointed in the ways things had deteriorated." Ziff-Davis couldn't be reached for this article.

Site Update

To turn things around, Muns said he has updated the group's Web site and put back on track HDI's newsletter, "Life Raft," which HDI members will receive six times per year.

HDI members also will have free access to the Support Research Network, a Web-based subscription service dedicated to customer support issues.

But even if Muns is successful in winning back disgruntled HDI defectors, "the industry isn't well-served by multiple associations," said Patrick Bultema, a help desk consultant in Colorado Springs.

Bultema — who was HDI's executive director in its pre-Ziff days — said, "The industry desperately needs an association to take an agenda-setting role."

A Portal for the 'Print' Key

Extranet offering joins crowded portal niche

BY CAROL SLIWA

The corporate portal craze marched on last week as Glyphica unveiled a product upgrade that will make it easier for companies to create personalized extranets and let users print documents at a home office or when they're on the road.

The Mountain View, Calif., software maker's niche in the crowded portal space has been helping companies convert existing business data — especially paper-based documents — into searchable Web pages that can be accessed through Internet, intranet or extranet portals and managed using its InfoPortal server.

InfoPortal software converts paper documents to Adobe Systems Inc.'s Portable Document Format (PDF) and performs optical character recognition to make them searchable.

The traditional approach to paper conversion uses high-end scanners and workflow, a combination that costs thousands of dollars per user, said Gerry Murray, an analyst at International Data Corp. in Framingham, Mass.

Human resources outsourcer Execustaff Inc. in San Jose, Calif., will use the upgraded InfoPortal to set up password-protected, individualized portal sites for its 75 clients, said Heidi Sodos, Execustaff's sales and marketing director.

InfoPortal also should let Execustaff eliminate the virtual private network that its San Jose, San Francisco and Boston offices currently use to access client personnel records, Sodos said.

New InfoPortal features to be announced this month include support for Extensible Markup Language and Open Database Connectivity, which will help users access data from enterprise resource planning and sales force automation systems, Glyphica CEO Deidre Paknad said.

JUST THE FACTS

Glyphica's Portal

Features of Glyphica Corp.'s InfoPortal 2.0:

- **"One-button extranet" that lets users organize content and provides the ability to add or collaborate on documents.**
- **New templates for creating personalized intranets and extranets.**
- **Lets multiple servers convert paper and electronic documents to Portable Document Format files simultaneously to improve scalability.**
- **Price: $72,000**

IT Departments Losing Budget Control, Staff

BY SARB COLE-GOMOLSKI

Technology budgets and staff are increasingly moving out of informatioo technology departmeots and into business units, creating new problems for IT managers.

Research released last week from Stamford, Conn.-based Meta Group Inc. shows that U.S. companies' application portfolios grew by 12% last year, while IT head count declined by 11%.

Sometimes that means IT is simply being asked to do more with fewer people, said Howard Rubin, a Meta Group researcher. But at many companies, jobs traditionally done by the IT department fall under business-unit managers.

Increasingly, those businesspeople control IT spending, too. Business units will control about 85% of IT spending by 2001, up from about 70% today, according to Cromwell Foote Partners LLC, a consultancy in Stamford, Conn.

For example, as vice president of electronic commerce at Reebok International Ltd. in Stoughton, Mass., Roger Wood controls his own technology budget. Wood, who has IT experience and marketing know-how, reports to the CEO.

"I am able to take down and build up features [of our Web site] without some IT overlord telling me what is good or bad," he said.

While business units revel in the autonomy, IT managers said that shift makes it difficult to implement staodards and integrate back-end systems.

"It's not that these departmeots woo't do good projects," said Mike Crowley, CIO at Rich Products Corp. in Buffalo, N.Y. But you can wind up with duplicate systems that aren't easily integrated, he said.

Another concern is that software vendors may peddle systems to business managers that their companies don't really need, said Don Gaidano, chief financial officer at Horizon Organic Dairy in Boulder, Colo.

"I recently had one department come to me and say they needed to buy this $1 millioo software package," Gaidano said. The department needed an inventory and logistics system, but it was being sold oo a larger system with other modules, he said.

Northwest Natural Gas in Portland, Ore., went through a period in which "whoever had the check bought what they wanted," said CIO Chuck Beyer. Now, there's a shift to recentralize projects through IT.

"We tell departments that we will keep their server behind our firewall and we'll handle backup, but they can do their own applications," Beyer said. "If policies allow departments to completely bypass IT, your back-eod [integration] work can get horrible."

MOREONLINE

For articles on IT professionals as business technologists and the intersection of IT and business, visit our Web site
www.computerworld.com/more





payback time.

introducing Micro Focus Net Express. the shortest distance between your legacy system and e-business.

> **COBOL is great for business applications, right?** But when it comes to extending them to the Web, you can use all the help you can get. Micro Focus Net Express from MERANT takes your core business applications written in COBOL and extends them to the Web. Fast.

Think about how much you've invested in your current enterprise applications. Now imagine if you had a seamless way to migrate your existing business logic to work with the most popular Web technologies, like ActiveX,® HTTP, HTML, CGI, JavaScript,™ JavaBeans,™ ISAPI, and NSAPI. Well now you do. Net Express allows you to develop cutting edge Web applications while maintaining your productivity-all with a tool that speaks your programmer's language.

It also helps to make your transition to distributed computing seamless by simplifying the process of re-hosting existing COBOL applications onto Windows NT and UNIX platforms.

So if you're in a rush to unleash the e-business opportunities hidden in your mainframe, don't delay. Register for your free Net Express evaluation CD today. It's probably the fastest ROI you'll ever get out of your mainframe.

> **Register today for a free Micro Focus Net Express evaluation CD.**

1-800-632-6265, ext. 311
www.microfocus.com/ebusiness

MERANT
Micro Focus®

© Copyright 1999 MERANT International Limited 1999. All rights reserved. Micro Focus is a registered trademark, and MERANT the MERANT logo and Net Express, are trademarks of MERANT International Limited. All other trademarks are property of their respective owners.

Gartner Study Warns Most Vendor Software Not OK for Y2K

BY THOMAS HOFFMAN

With 263 days to go until the year 2000 ball drops in Times Square, an astounding 81% of vendor software applications still aren't millennium-ready, according to a Gartner Group Inc. report released late last month. Furthermore, testing shows that 6% of vendor software that shipped following year 2000 patches isn't completely compliant.

The 81% noncompliance rate for commercial software packages is better than the 88% figure tallied six months ago, but progress is "not happening fast enough," said Lou Marcoccio, year 2000 research director at the Stamford, Conn.-based research firm.

Version Bugs

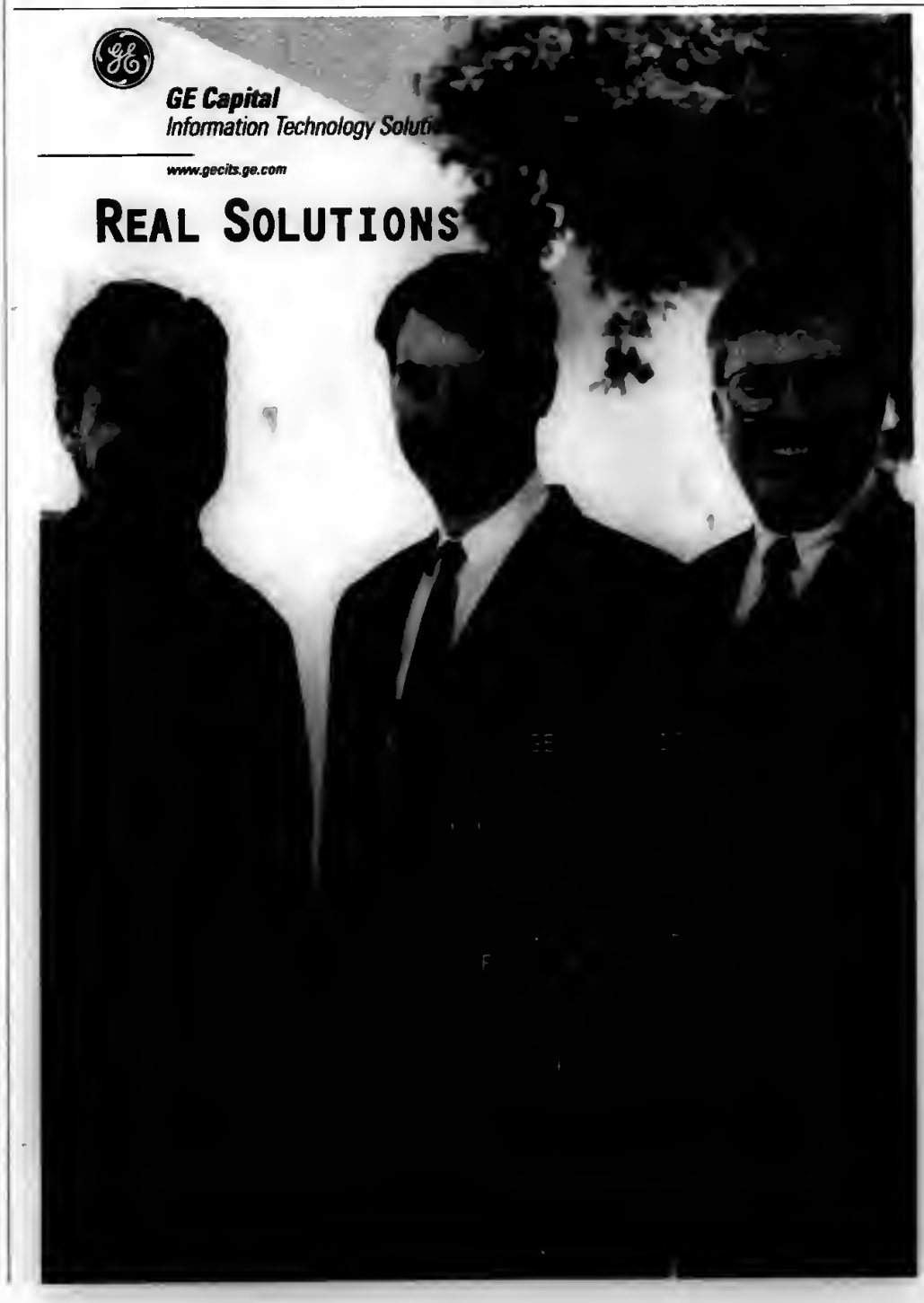
One of the biggest exposures for corporate customers is the uncertain readiness of Windows 95, said Jeffrey Tarter, editor of "Softletter," a Watertown, Mass.-based industry newsletter. Microsoft Corp. "has been very ambiguous" about whether it has identified and fixed all the millennium bugs in Windows 95, he said.

Of the so-called year 2000-ready packaged applications examined by Cap Gemini America's application renovation center in Tarrytown, N.Y., 10% to 15% still contain an average of four to five millennium bugs per program, said Noah Ross, who runs the center. Cap Gemini reviews the year 2000-readiness of homegrown and packaged software for corporate clients.

The problem for many corporate customers is that to receive a free year 2000-ready version of a vendor's software, customers have to be using the most current version. "Many customers don't, and it's a big problem," Ross said. For example, about one-third of all corporate users are still running Windows 3.1 and haven't upgraded to Windows 95, Windows 97 or Windows 98 applications, Tarter said.

Abe Nader, senior vice president of information systems at Dollar Bank, tackled the problem head-on. The Pittsburgh-based bank had "severe" problems with several vendors whose software was purported to be year 2000-ready but wasn't, he said. For instance, a mainframe-based loan system had to be sent back to the vendor four times before the date problems were finally ironed out. Nader and his staff tested all vendor software themselves and brought in an independent auditor to test the software again. That led Dollar Bank to repeatedly go back to vendors whose software continued to contain millennium bugs and demand that the problems be resolved.

"It's not an issue anymore," Nader said. "We applied hammer-type pressure on the vendors to fix this, and it's taken care of now."




pentium !!!
xeon
intel

Power for the Wired Enterprise.

Introducing the Intel® Pentium® III Xeon™ processor. Performance for enterprise servers.



We're living in a wired world. And since your server is at the heart of it, the power and stability of Intel® Architecture is more important than ever. Specifically designed for today's connected enterprise, the Pentium® III Xeon™ processor is our highest performing processor for servers. Working together with Pentium® III processor-based PCs, it provides the performance and reliability you need to run your critical e-business applications. From back-end database hosting to transaction processing. On UNIX and NT. To learn more about the Pentium III Xeon processor, visit us on the Web. ► www.intel.com/it

intel.

The Computer Inside.™

BRIEFS

Feds Concerned Over Phone Merger

The U.S. Federal Communications Commission is asking for more assurances that a proposed acquisition by San Antonio-based SBC Communications Inc. of Ameritech Corp. in Chicago won't stifle competition in the telecommunications market before the agency approves the deal. An SBC official said SBC and Ameritech will reluctantly cooperate with the federal agency.

Intel to Invest in Speech Recognition

Intel Corp. has signed a letter of intent to invest $30 million in Lernout & Hauspie Speech Products U.S.A. Inc., a speech-recognition software vendor. The investment is subject to government approval and a final OK by both companies.

Sun To Support NT

Sun Microsystems Inc. has added products to become more compatible with Windows NT, a chief rival to its Unix offerings. The new products include Solaris-to-NT connectivity software, a PC-on-a-card add-on for its Solaris workstations and NT-certified storage products.

Optical Disc Alliance Forged

Lucent Technologies Inc. in Murray Hill, N.J., and Sirus Technologies Inc. in San Jose last week announced a multimillion-dollar alliance to develop new optical disc technologies that could deliver 10 times the storage density of today's hard drives. Privately held Sirus will get an investment from Lucent and rights to some optical technologies.

Short Takes

Push technology vendor POINTCAST INC.'s founder, Chris Hassett, is trying to become the majority owner of the much-hyped company. . . . Business-intelligence software maker COGNOS INC. saw quarterly revenue rise 23% to $66.9 million compared with a year earlier, while net income rose 29%.

USERS WAIT OUT INPRISE TURMOIL

CEO, CFO leave; company gives no hint about future; financial analysts unnerved

BY DAVID ORENSTEIN

TO BE A customer of development tools and middleware company Inprise Corp. is to be willing to endure constant uncertainty about the struggling company's future for the sake of using its highly regarded technology.

The yawning chasm of possible fates awaiting the Scotts Valley, Calif., company grew wider this month when chairman and CEO Del Yocam and Chief Financial Officer Kathleen Fisher resigned. (Yocam will remain a director.)

The company hasn't explained the shake-up, leaving users and analysts to scratch their heads about the future. Inprise may be acquired by a vendor like Sun Microsystems Inc. or Oracle Corp., or it will struggle on alone despite looming financial uncertainty, analysts said.

Users said they'll wait for an outcome before switching from Inprise products.

"I listen to the speculation, but I don't follow it until I feel it in my gut," said Mike Riley, director of Internet application development at R. R. Donnelley & Sons Publishing Corp. in Chicago. But Riley wondered, "Is there something that Del knows that we should be aware of?"

Fundamentally, if the coders who develop the technology can remain productive, the quality of the products will still be good, said John Melka, manager of information systems tools at NationsBanc Corp. in Chicago and a member of Inprise's customer advisory board.

Awaiting the Numbers

Financial analysts said they were unnerved that Fisher resigned so close to the end of a fiscal quarter. The situation suggests that the company's finances may have taken a turn for the worse, said Matt Belkin, an analyst at Hambrecht & Quist LLC in San Francisco.

And Yocam may have been forced to leave Inprise because he was unable to restore the company's growth, Belkin said.

Despite changing the company's name last year from Borland International, steering it toward enterprise customers, splitting it up and laying off hundreds of people, Yocam essentially had no effect, Belkin said.

The split was designed to accommodate the company's older tools customers as the company targeted higher-level enterprise customers.

Rather than endure another attempted turnaround, Belkin said, investors might support a takeover, but a new owner might not continue to support Inprise's desktop development tools. That market isn't growing as fast as enterprise Internet tools. ▶

Yocam Says He Chose To Leave; Defends Performance at Inprise

In an interview with *Computerworld* senior writer David Orenstein last week, Del Yocam said leaving Inprise was his idea and defended his performance as CEO of the company.



Q: Why did you resign from Inprise?
A: I began really thinking about slowly withdrawing from an operating role at the company over the Christmas holidays. . . .

From a daily operating perspective, [division presidents] Jim [Weil] and John [Fleiszar] were really operating the company during the first quarter. . . . I was open-ended about when I would actually be leaving.

Q: Can you discuss your performance at the company?
A: The first year [1997] I characterize as the turnaround.

You have to remember that when I got there, there was enough cash for two or three months and then it was all over with.

We not only survived, but we returned the company to stability and profitability.

The second year, 1998, really is characterized by the transformation with a new strategy [the enterprise], a new direction and acquisitions [of software and service firms]. . . .

The real growth scenario, I personally believe, is out in the year 2000.

Eubanks Moves from PCs to Networking

Is his move proof of PC's decline?

An era ended in the PC industry last week when **Gordon Eubanks**, one of the longest-serving software CEOs, said he would leave Symantec Corp. after 15 years. Symantec is the second-largest maker of PC utility and antiviral software.



Eubanks is taking over as CEO of Oblix Inc., a small Mountain View, Calif., developer of applications based on corporate directories.

Is Eubanks' move from a PC to a networking company evidence of the decline of the PC as an applications platform? *Computerworld* editor in chief Paul Gillin and staff writer Matt Hamblen spoke with Eubanks.

Q: IBM's Louis V. Gerstner was recently quoted as saying the PC era is over. Do you agree?
A: I think what Gerstner meant is that we're in a world that involves connectivity and doesn't revolve around the PC.

In that regard, the focus is no longer on the PC as it was in the past. The PC is alive and well, but it's serving a connected world.

Bandwidth becomes a more important issue than computers, and computers become embedded. Increasing bandwidth enables applications to be built on a directory.

Q: Symantec built its business on relieving the complexity and instability of PCs. Have PCs simply become too complex to be worth the trouble?
A: I have talked a lot about this question [at Symantec]. I try to get people to wake up to the fact that the customer is going to get tired of buying products to make the device simple.

Manageability and security are the two driving agendas in IT. Computer complexity can work against that.



GORDON EUBANKS: "The PC is alive and well, but it's serving a connected world"

Q: Why are you going to a small company like Oblix?
A: I have a high level of confidence in [companies backed by venture capitalist Kleiner Perkins Caufield & Byers]. Oblix has Netscape and Novell behind it. And virtually every corporation will be using directories.

Large organizations spend hundreds of dollars a year per employee printing phone books that are immediately out of date. People who have to work together in remote locations need to be able to find each other.

I believe the client/server applications will migrate to a directory-based architecture in the future. ▶

"At Sony, we installed
at

I developed reports myself and
put them on the Web by



How does Sony Electronics put so many great products in the hands of consumers? They use WebFOCUS to put up-to-the-minute inventory data in the hands of their managers.

WebFOCUS is a powerful Web reporting and analysis system that can access any database and platform, so it was easy to consolidate data. And it's so productive developers were able to put new reports on their intranet in minutes.

Gary Fischer, Data Warehousing Manager at Sony Electronics says, "It gives everyone from senior executives to operational staff the answers they need when they need them."

Now that's remote control.

www.ibi.com/scw

Information Builders.

UNITING THE WEB
AND THE ENTERPRISE

800-969-INFO. In Canada call (416) 364-2760. E-mail info@ibi.com
WebFOCUS is a trademark of Information Builders, Inc. New York, NY

MARYFRAN JOHNSON

Deep blue thinkers

WHEN SMART PEOPLE TALK about the future, they like to point out that it's already here. The puzzle pieces are scattered around right before our eyes, but we don't quite grasp how and where they fit together. So I took a kind of shortcut to the future last week. I spent a day visiting the headquarters of IBM's massive, $5 billion research operation on the outskirts of New York.



MARYFRAN JOHNSON is executive editor of *Computerworld*. Contact her at maryfran_johnson@computerworld.com.

I confess I expected a lot of high-level research wonkery and ivory-tower talk about supercomputing. Instead, I mainly heard talk about customers and electronic commerce's impact across industries as diverse as pharmaceuticals and grocery chains.

I can't do the deep blue thinkers much justice in this small space. But here are a few of the puzzle pieces IT managers should be thinking about:

■ "Pervasive" computing is moving beyond buzzword and happening as quickly as the rise of Web commerce did. The emerging generation of smart devices will remotely connect your users with every service you can think of (and more you can't even envision). Standard protocols will be crucial in every piece of technology you buy.

■ Voice recognition could well be the great sleeper technology of the late '90s. The mobile telephone (already numbering 100 million worldwide) is actually the best candidate for "thin client of the future." It won't be long before we're accessing Web pages or e-mail via voice command and having information read back to us wherever we are.

■ Software systems to manage customer relationships and supply-chain contacts will be an order of magnitude more important to your company's future than today's business darling, ERP. The most successful companies will become "brokers" for whatever supplies or services their customers require — or suffer the loss of those clients.

If the IBM brainiacs are right, the most powerful companies of the future will see the big picture before all the technology pieces are in place. Who better to solve this puzzle for them than IT? ◗



GALEN GRUMAN

Silicon Valley needs a real agenda to enter politics

UNTIL RECENTLY, POLITICS was a necessary evil among the denizens of Silicon Valley. But then came the regulators of all political persuasions: from liberals seeking to prevent monopolies and increase minority participation to conservatives seeking to regulate the content of the Internet and prevent taxation. These days, politics matters.

Last week, a group of Silicon Valley execs urged Texas Gov. George W. Bush tn run fnr president. And Vice President Al Gnre stopped by for yet another visit to get support.



GALEN GRUMAN is *Computerworld*'s West Coast bureau chief and opinions editor. Contact him at galen_gruman@computerworld.com.

It used tn be that no one cared about Silicon Valley nr its hub nf San Jose. Liberal San Francisco attracted all the attentinn, and that helped paint the whnle Bay area as a liberal funding source. The youth-oriented culture nf the Valley also contributed tn that picture, and it wasn't surprising that the Clinton Democrats glnmmed nn tn the region as a fund-raising center as it grew in econnmic importance. It seemed as if the Valley would fnllow Hnllywood down the path toward becoming a captive fund-raiser for nne party.

But the Valley is not a liberal bastion — it's a libertarian bastion. Sure, the laid-back Califnrnia culture has had an effect: People play at wnrk, bring in their dogs, work out trade tips nn berbal remedies, know their curries and do yoga.

Don't confuse culture with politics. The live-and-let-live attitude doesn't get in the way of making money. "Start up. Kick butt. Cash out." is becoming a popular slogan here among the Internet gold rushers: wnrk hard, get rich and ignnre the bozos. Although wnmen, gays, Asians and foreign nationals have become part and parcel nf the Valley, blacks and Hispanics remain largely nn the outside, because tbey're not connected.

The Valley's libertarianism makes it a wild card for tbe political establishment. Its mix of left and right could neutralize the strength nf the Valley's would-be politicos. Or they could get bogged down in minutiae that make them irrelevant. I still remember the preoccupatinn nver pensinn portability in the mid-1980s that caused the Institute nf Electrical and Electronics Engineers to become ridiculed in Washington as a narrow, self-

serving economic special interest group disconnected from other priorities and supporters.

The Valley could similarly get mired in such minutiae. I'm amazed how many people in IT get angry when they see political issues discussed or covered, as if they lived apart from the world.

But if the Valley's leaders — and IT leaders by extension — can rally around a set of priorities, they could become a true political force in 2000. With a faction endorsing Bush and another rallying around Gore, the stage is set to do more than raise money or look after narrow interests. The energy, passion and creativity here can — and should — do a lot more than that.

DAVID MOSCHELLA

IBM's deals point to an Asian-style self-reinvention

AREN'T YOU JUST a little bit confused by IBM's recent OEM deals with archrivals Dell and EMC? What, if anything, does that say about where IBM is heading and what sort of company it expects to be in the 21st century? Because so many customers are still so dependent on IBM, those questions are anything but academic. Here's my take on the situation.



DAVID MOSCHELLA is an author, independent consultant and weekly columnist for *Computerworld*. Contact him at dmoschella@worldnet.net.

Let's begin with IBM's public position. The company acknowledges it needs to grow, and it has identified services, software and technology as its primary growth vehicles. The first two selections are obvious, but the third is instructive. By "technology," IBM basically means "components" — semiconductors, flat-panel displays, disk drives and so on. Conspicuously absent from the current corporate growth formula are end-user hardware products such as PCs, printers, network equipment and storage.

Although those end-user markets are all growing rapidly, IBM has found it difficult to keep pace with Dell, EMC, Cisco, Sun et al. The recent report of big losses in its PC division highlights IBM's generally lackluster performance in its major equipment businesses. That raises an obvious management question: Why should IBM's end-user products be the only major outlet for IBM's advanced components? Why not find a way to sell through both IBM and non-IBM channels and see how the market reacts?

In the U.S., that's an unusual way to operate. IT component companies — such as Intel, National Semiconductor and Komag — generally don't participate in end-user markets. In contrast, equipment leaders such as Compaq, Cisco and EMC typically stay out of the component business. However, mixing those two models is commonplace in Asia. Despite their current problems, NEC, Sony, Hitachi, Samsung and others have shown that a company can successfully sell both components and the equipment that uses those components.

IBM is trying to establish a similar structure. For decades, we have heard about IBM's huge investment in research and development, its world-leading labs, its many advanced technologies, its vast patent portfolio and so on. But historically, those efforts have all been part of the underlying corporate infrastructure; their real market value has been almost impossible to assess.

No longer. IBM will eventually find out if the market thinks enough of its advanced technology to buy it. Despite the glossy deals with Dell and EMC, it's still way too early to really know.

My own view is that a decade from now, IBM will probably be pretty much out of the hardware business except, perhaps, in mainframes. Someday, it might even rename itself IBS, with "Services" replacing the increasingly anachronistic "Machines." That would complete a cycle of industry evolution. Nearly all of the original U.S. mainframe and minicomputer vendors have already either disappeared or become services companies. IBM is taking so much longer simply because it was so much stronger to begin with.

It would be easy for IBM to resign itself to this destiny, steadily selling off struggling businesses as it has already done with printers, Prodigy and the IBM global network. Many customers would actually approve, happily accepting, for example, Dell PCs and IBM service. But it's heartening to see that the onetime core of IBM doesn't intend to disappear without a fight.

What better way to try to stay in the high-technology business than by giving every major component of the company a chance (perhaps a final one) to prove itself? If you prefer today's IBM to a future IBS, then you'd better wish them luck.

READERS' LETTERS

Java flaws not as they appear to be

THE OPINION piece by Jon Campbell ["The Many Flaws of Java Should Make You Think Twice," CW, Feb. 15] was an interesting, although largely inaccurate, treatment of Java. It seems to indicate a fundamental misunderstanding of Java development. The issues cited were bizarre and unfair.

First, support of Java native methods may be limited, but support is provided from antiquated systems. Second, Java is an object-oriented implementation. The reference to overabstraction is odd. Perhaps Mr. Campbell deals only with programs where the abstraction benefits are not fully recognized.

Third, there are no grounds for criticizing Sun for underhanded tactics. New chips and Linux are not propelling Sun to push an unnecessary technology.

Java is a — not the — unified development platform and was not designed to replace other development methods, platforms and languages. Java — as well as Python, Eiffel and others — is an important object-oriented development tool.

Unfortunately, Mr. Campbell and many like him do not recognize the significance of this change.

Shannon Brown
President
Rubicon Gulch Software LLC
Manheim, Pa.
shannonbrown@rubicongulch.com

Middleware should be used with ERP apps

REGARDING the Feb. 15 article "2 Microsoft Upgrades Target the Enterprise; Scalability of SQL Server 7.0 for ERP Apps Questioned," I believe a key factor may have been overlooked: middleware. I don't know if these packages are using any middleware but if they aren't, they should be.

We use SQL Server 6.5 rather heavily in a few places throughout the organization, and when it is being accessed through middleware running under Microsoft Transaction Server (or probably any other resource pooling middleware broker service), we see only a handful of user connections to the database server even when there are many hundreds of actual users hitting the database simultaneously.

While I don't necessarily have evidence to dispute some of the numbers, I do have good reason to ask about the real-world relevance of those numbers to a system built on top of a modern multitier architecture. If the ERP systems you mention are moving in this direction, the new systems might not represent the risk the author suggests.

Jon McGuire
Senior developer, Advanced Computing Environments
Merrill Lynch & Co.
jon_mcguire@ml.com

Humanitarian agency lauds global Y2K story

THANKS to Kathleen Melymuka for her March 8 article on the global nature of the year 2000 problem ["The Hunt for Global Glitches"]. It was just the sort of thing that needs to get discussed.

We are a nonprofit, nonsectarian, nonpolitical humanitarian agency that is doing its best to cover the global aspects of Y2K, particularly the impact on poorer "emerging markets" and developing nations. The potential for widespread civil strife and economic collapse in some of these nations is very real.

We have a new site up, currently going through a redesign and a major expansion at *www.global Y2K.org*. We have a Y2K Resource Center, which we have restricted to only 10 Web sites and a handful of articles. I am adding your article to it tonight as I believe it is a good example of responsible journalism and good information.

Robert L. Adams
Executive director
Global Development Center
Washington
bob@globaldevelopment.org

COMPUTERWORLD welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Maryfran Johnson, Executive Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 875-8931. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.

TCO less than half of Lotus Notes.

Better than 99.9% reliability.

More than 25 million users in 3 years.

Just a few facts* to help you with your messaging and collaboration server decision.

*The Radicati Group, Inc. study sponsored by Lotus Development Corporation and Microsoft Corporation, October 1998. †Reliability data based on actual customer deployments, more details at http://www.microsoft.com/exchange/55/casestudies/reliability.htm.

Corporation. © 1999 Microsoft Corporation. All rights reserved. Microsoft and *Where do you want to go today?* are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Other products



As you evaluate the best messaging and collaboration server on which to standardize your IT infrastructure, you want the facts to make the best long-term decision for your company. With Microsoft® Exchange Server you get low TCO, high availability, and high scalability. Plus, Exchange is a choice that puts you in good company, with widespread adoption among such demanding enterprise customers as Dell, Merrill Lynch, Northrop Grumman, Siemens, and Toys "R" Us. If you need more facts or to get your free Exchange Evaluation & Migration Kit, visit **www.microsoft.com/exchange/**

Microsoft
Where do you want to go today?®

Reliability results vary based on server hardware, server software, performance monitoring and adopting best practices for operations. Electronic Mail and Messaging Systems Newsletter February 5, 1999 and data from Microsoft and company names mentioned herein may be the trademarks of their respective owners.

SAM ALBERT

E-commerce revitalizes 'co-opetition'

IT'S A CLASSIC business strategy: Size up your competitors, then capitalize on their weaknesses. Yet too often, businesses that play this game put control right into their competitors' hands by responding to rivals' moves with predictable counter-moves.

It's the mind-set of the embattled, and it has caused innumerable lost business opportunities. Instead, I've learned that the best possible outcome isn't always win-lose.

In 1991, I coined the term "co-opetition," which is about competitors cooperating together when there's a mutual benefit to be gained. Although the concept is 8 years old, today's explosion of Internet commerce makes it more relevant to business success now.



SAM ALBERT is a management consultant and IT industry analyst in Scarsdale, N.Y. Contact him at [redacted]

Internet commerce is expected to reach close to $95 billion in sales just within the next 12 months, according to International Data Corp. That's enough incentive to go around! The best way to tap in to the Internet-commerce market is through the sharing of resources, intelligence and opportunities.

What I'm referring to is a smart business tactic, not sentiment. Through alliances with competitors — which for some, would mean loosening their grip on stringent account control — both parties can capitalize on new business opportunities by blending their distinct advantages.

Here's a recent example of co-opetition at work: In March, computer giants Dell Computer and IBM signed a multibillion-dollar deal. During the next seven years, Dell will purchase $16 billion in components from IBM, one of its major competitors. Why? It has to do with each company's critical-success factors.

IBM's component manufacturing business has been growing at a 40% annual clip since 1993. Likewise, Dell plans an expansion of its product mix, and its deal with IBM gives it access to research and development tools needed to make that new mix work.

In other words, both companies are confident they can achieve success by entering a sort of gentlemen's agreement that renders them stronger together than apart.

We also saw co-opetition at play last year, when Apple Computer's Steve Jobs announced a surprise alliance — not seen since the first days of the Macintosh — with Bill Gates and Microsoft. After sustaining an operating loss of more than $1 billion in 1997, Apple landed back in the black last year, thanks in part to Microsoft's investment in Money and Office software for Macintosh users. Microsoft, in turn, enjoyed expanded markets for its Windows and Macintosh products.

Co-opetition takes a commitment to one, joint initiative to see a payoff. It's a delicate dance, engaged in by present, former and perhaps even future rivals. But with the dollars at stake today, what business can afford not to give it a try?

In 1991, I told a reporter at *The Wall Street Journal* that IT "has become so wide-ranging that no company can do everything itself." That statement was never more relevant than it is today. Few companies, if any, can cover all the bases alone. Technology has rendered that nearly impossible.

The new millennium will see a consolidation in the information industry, jump-started by the electronic-commerce phenomenon. The Internet makes co-opetition more necessary, more vital, than ever before. Put on your creative thinking caps and go for the ride! ▶

BILL LABERIS

Levi's shows IT may not be driver it pretends to be

VIRTUALLY every week, readers of trade publications and magazines are treated to story after story extolling the virtues of IT working hand-in-glove with senior management to bring profits and prosperity to the company. Some of those stories go so far as to suggest that IT is actually driving the corporate bus, signaling its own turns and steering its own course.



BILL LABERIS is a consultant in Holliston, Mass., and former editor in chief of *Computerworld*. Contact him at [redacted]

Then along comes a corporate flop story like that of Levi Strauss, which causes anyone truly honest with oneself to ask, "Just how important is IT to the success of the company?"

Why Levi Strauss? For years, Levi's was touted in all learned IT quarters as the paragon of what computer technology, intelligently deployed, could do to foster and lead the success charge, even in a relatively unglamorous business like making pants.

Under the direction of one of the biggest-name CIOs in the business, Bill Eaton, Levi's decentralized its IT infrastructure, breaking up its sprawling organization into smaller departments headed by "mini-CIOs." And the pundits cheered.

The company heard Michael Hammer's re-engineering mantra and embraced it as an IT religion as fully as any other company out there. The pundits and the re-engineering consultants raved.

Mustering all of its IT intelligence and decentralized energies, Levi's attacked a supply-chain problem that sought to slash 80% of the time it took to get a new jean style from the designer's head to the store rack. The pundits roared their approval.

And when Levi's set out on an IT-driven plan to make custom-fitted jeans and deliver them to the customer within three days of a fitting for just a little more than off-the-shelf jeans, well, the pundits were just about speechless. Here was Levi's — the manifold expression of everything that IT can and should do for a company, from enabling new strategies and tactics to using itself— as the poster child for democratic management.

However, IT at Levi's seemed to forget something very important along the way to corporate immortality. That "something" is at the heart of the IT role today just as it was 20 years ago and will be tomorrow, too — no matter what you want to think: You are only as good as the quality of usable information you provide to others, those who really run the company.

Sure, IT helped build a supply-chain management structure that cut deeply into time-to-market. But at what expense? Turns out, a very high expense. Ditto for the companywide re-engineering, which fiusbed hundreds of millions of dollars down the consulting sewer with no perceptible return.

Where was IT to warn senior managers of the sharply escalating costs, which needed to be judiciously balanced against the real benefits of time-to-market gains and the fuzzier benefit of re-engineering all business processes?

More to the point, why didn't IT seek to deploy the right business-intelligence tools that would have alerted senior management to some startling facts about the jeans market? Facts like, kids and teens don't wear the same styles of jeans as their parents. Duh!

Here's the killer: It turns out that IT actually did deploy many of those business-intelligence tools and did gather vital information on the market and on internal operations. But IT lacked the persuasiveness, the power, dare I say the credibility — even at that enlightened and progressive company — for its voice to have much impact.

That disconnect hasn't just happened at Levi's. Before Wal-Mart, Kmart had the mantel of IT retail success, and its IT department did everything right while senior managers did everything wrong.

There are very real limits to IT in the company. Don't get caught up with all the theater and lights when some of you are turned into superstars on magazine covers. Make the trains run on time — and then just hope the engineer knows where the hell he's going. ▶

Join the cc:Mail customers who have already switched to Microsoft Exchange Server.

Find out for yourself why former cc:Mail customers such as Dell, Merrill Lynch, Northrop Grumman, Siemens, and Toys "R" Us have migrated to Microsoft® Exchange Server.

The new Exchange Migration Program is specifically designed to simplify your migration from cc:Mail, Microsoft Mail and GroupWise to Exchange, making it as seamless as possible through a complete set of tools and industry partner support. Plus, Exchange Server works well with your current messaging system so you can stage your deployment at your own pace rather than having to do it all at once. **Order your FREE Exchange Evaluation & Migration Kit today at www.microsoft.com/exchange/migration or call 888-658-7230, Dept. C615**

The Exchange Migration Program includes:

- A free migration kit that comes with a 120-day trial of Exchange Server 5.5, latest migration tools, best practices, case studies, and whitepapers



- Special discounts on migration services and seminars
- Free online how-to migration seminars
- Competitive upgrade pricing

Microsoft
Where do you want to go today?®

© 1999 Microsoft Corporation. All rights reserved. Microsoft and *Where do you want to go today?* are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Other products and company names mentioned herein may be the trademarks of their respective owners.

We know a service provider

that delivers global

financial news to

16,000 places every minute.

In the New World,

information never sleeps.



Cisco Powered Network™

The sun never sets on the global marketplace. Especially for a major business news wire that reports the latest breaking financial news to business leaders in 24 countries. So it's no accident that it relies on a Cisco Powered Network™ service provider. Welcome to the New World — where Cisco Powered Network service providers are changing the way people share ideas and information in extraordinary ways. Impressive, but not surprising when you consider that virtually all Internet traffic in

©1999 Cisco Systems Corporate logo, "Empowering the Internet Generation" and the Cisco Powered Network logo are registered trademarks or trademarks of Cisco Systems, Inc. All rights reserved.

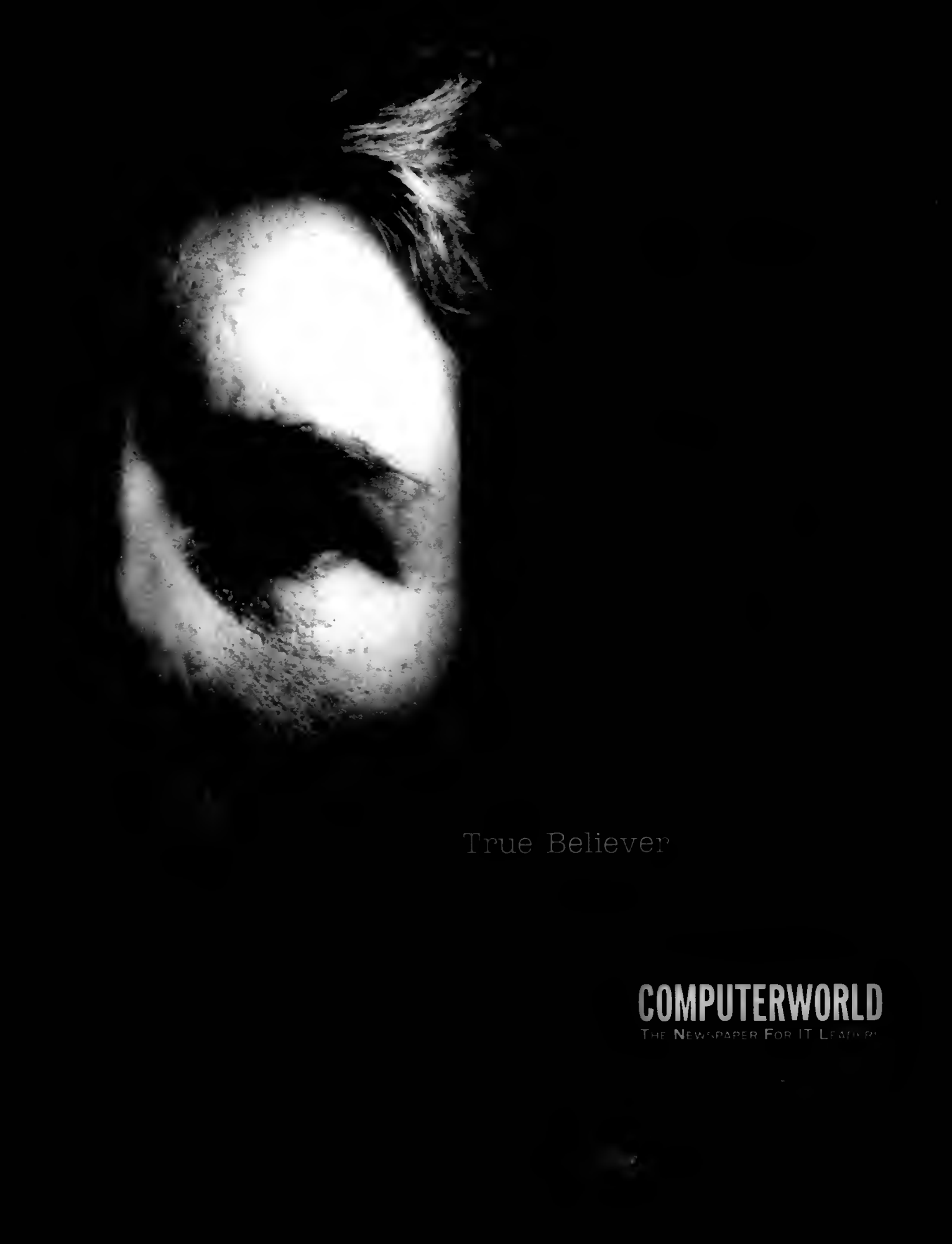


the world travels across the systems of one company. Cisco Systems. We can help you achieve the same exceptional results for your business. Look for the Cisco Powered Network mark or visit us at www.cisco.com/cpn.

We'll match you with a Cisco Powered Network service provider who can reliably extend your network over a Cisco-based infrastructure. And beyond.

CISCO SYSTEMS

EMPOWERING THE INTERNET GENERATION™



COMPUTERWORLD
THE NEWSPAPER FOR IT LEADERS



HEWLETT PACKARD

Harnessing the Power of Change in the Data Center

IDC

HOW IT WILL CHANGE DATA CENTERS

By Thomas D. Oleson
International Data Corporation

CIOs who achieve excellence in their IT operations usually do so by keeping one eye on enterprise objectives and the other on technology change. Excellence in this instance means applying the best technical solutions for the highest priority business problems.

CEO priorities are what often set a clear agenda for CIOs. As part of its Spring 1998 Global IT Survey, IDC has identified the top two business priorities of CEOs: increasing productivity through improvements in the infrastructure and, within the IT organization, implementing new strategic applications using newer, more efficient technologies. What does all this mean for CIOs? Just this: that the top IT priority has been to improve operational efficiency while aligning the development priorities around new, strategic business applications.

With the conclusion of the two mammoth projects—Year 2000 and the Euro—that have sidetracked IT organizations for months, CIOs will now be able to refocus on adding value to



their organizations. Striving for operational efficiencies, in order to better serve the business needs of the enterprise, will be a good start for this effort.

To accomplish this objective, many CIOs have evaluated how new technologies can make IT operations more efficient. This evaluation often takes the form of a review of the entire IT infrastructure, the data centers and their installed technologies, the data networks, the software infrastructure that supports the applications, and the technology support staff itself. Often, the review results in the consolidation of data centers and the adoption of new technologies.

For companies not yet actively engaged in projects to increase IT efficiency through the adoption of new, cost-effective and operationally superior technologies, IDC encourages the formation of a major review effort (a process sometimes referred to as "the reckoning"). No part of the infrastructure should escape this review; CIOs should remember that technology is not an end in itself, but a means to the business ends of an organization. There should be no sacred cows—not the buildings which are the data centers, not the legacy mainframes, not the OASO farms that serve them. Although most data networks are new in design, they too should be subject to review. So should the application and infrastructure software and the IT staff.

There are three issues that should be foremost in the minds of CIOs as they consider whether to consolidate their organizations' information systems. Issue #1: CIOs should realize that technology concepts are markedly different today than they were just a few years ago. IT systems are no longer processor- or server-centric, but network-centric. Application development is no longer process-centric, but data-centric. And this is issue #2: that IT is moving toward being business-centric, rather than technology-centric, with the single goal of providing Information On Demand (IOD) to the business. The focus is IOD for the business units, not technology for its own sake.

IOD means that consumers will be able to access the information they need quickly and reliably, and that they will be able to experience the same dependable access and pervasiveness from IT that they have come to expect from utilities, such as the telephone company or energy providers. With the emergence of IOD, IT will have reached a new plateau in effectiveness, and a new customer-driven relationship between the business units and technology services will have come into being.

Issue #3 is that these emerging concepts are leading to a paradigm shift. Although line-of-business (LOB) departments could manage isolated application servers in the past, they are not as well-positioned to manage the networks of multiple servers, nor the growing complexity of these multiple servers, nor the related storage. In any review of IT's effectiveness, this is an issue that needs to be addressed as early as possible.

The CIO must help LOB executives realize that the



business units of an enterprise are not prepared to manage shared resources such as network resources, multi-function servers and enterprise data. No matter what the expertise of these executives, they are not capable of dealing with network outages, broadcast storms or incompatible protocols

What's more, information collected by one department is becoming increasingly vital to other departments. As a result, processes such as the uniform management of data by database packages, its cleansing and storage in data warehouses and data marts, and its sharing across the enterprise, have become services that are the responsibility of the emerging corporate IOD facility—services falling outside the focus and capabilities of LOB managers Once this understanding is established between the LOB executive and the CIO, the future roles and responstbilities of their respective organizations can be delineated.

Reviewing the possibility of consolidation

Once the political issues surrounding the subject of distributed data centers have been addressed, IT managers should review the possibility of consolidation with respect to all major system components' hardware platforms, storage systems, application software suites, infrastructure software and networks.

For organizations that have multiple data centers, consolidation promises an improved return on tnvestment to the LOB customer by creating a corporate IOD facility with 24x7 service. As the number of midrange and large servers has proliferated over recent years, so have the Inefficiencies resulting from underutilization and incompatibilities among operating systems. The opportunity for significant savings in this area is a very substantial one

At the same time, data storage design is crying out for rethinking and consolidation, as the total cost of ownership (TCO) continues to climb at an unacceptable rate CIOs should also examine infrastructure and application software, in order to eliminate overlapping products and to reduce the number of suppliers

Networks are another candidate for consolidation. A good starting point for CIOs is to simplify network design and reduce the number of protocols. At a time when improving productivity is a top business priority, recent advances in telecommunication technologies offer further potential for consolidation (such as blending voice communications over an IP backbone) In short, network consolidation can significantly enhance the delivery of the company's products and services, and can foster IOD by revisiting the efficiencies of centralized, consolidated systems.

The following section will take a quick look at each potential area of consolidation.

Servers can be consolidated in several ways. In its simplest form, consolidation means co-location, that is, bringing a geographically dispersed collection of servers to a single site Server consolidation can also mean replacing a multitude of smaller servers with fewer, larger machines

The decision to consolidate is not all or none. In certain settings, there may be real value in establishing "location" centers—glass cupboards that consolidate computing resources at a remote site. A location center can afford better power systems and fewer backup tapes, and, from a management point of view, it can be

Liz Claiborne Inc.

Eliminating the Y2K threat

is a deadline that will not budge. Like many computer systems and software products, several of those used by Liz Claiborne Inc., a designer of fashion apparel and accessories, accept only two-digit entries in date code fields. The outdated system was unable to support the operational effectiveness, reduction in cycle time and the complexity the company required.

In 1996, Liz Claiborne launched an overhaul of its information systems. To ensure Y2K compliance and to better meet the increasingly sophisticated needs of the retail industry, the company decided to rebuild its business applications with new platforms and software, rather than fix 25 million lines of legacy code. The project included:

- deploying an information system that would streamline decision-making, facilitate integration between business units and make all systems Y2K-compliant;
- developing a system to increase responsiveness to customers by providing timely information that will reduce production costs, complexity and cycle time;
- creating a business-to-business extranet Web site that gives customers access to realtime purchase order delivery information and provides a direct link to customer specialists.

The overhaul involved migration to an HP 9000 UX and Oracle-based environment. Packaged client/server applications run on HP 9000 K class servers and feed a centralized data warehouse with a decision support system (DSS). Most of the enterprise applications, including the warehouse automation and management systems, design automation applications and automated merchandising system, run on HP K class machines. The core business system runs on HP V class servers. The DSS runs on the HP EPS 22 Enterprise Parallel Server.

The company selected Hewlett-Packard to be its strategic technology partner because of its reputation and strong partner relationships with other industry leaders. Liz Claiborne decided to move from a vendor with which they had a 20-year history to partner with Hewlett-Packard because they wanted to minimize risk, to have reliable technology, and to have a single large database running on a single hardware platform—a client/server architecture that would support an Oracle RDBMS.

In addition to providing the hardware, Hewlett-Packard is acting as a partner on the Internet application. "It's a true partnership experience," says Liz Claiborne CIO John Sullivan. "We share the risks together with the successes. We couldn't expect any more from a partner.

"They helped us to architect hardware plans for 1998 and for the future. In fact they acted as the chief architect for the system. They've introduced us to other partners to collaborate with. They've provided consulting services on business and technical issues. They've acted as trainers, bringing 200 people from one platform to another via training programs. They've delivered everything they promised, and more."

The planning stage of the project is complete and the systems development and pilot implementation stages are in progress. The company's financial systems were upgraded for Y2K compliance in 1997. The testing and the initial implementation phases of a significant portion of the project have been completed.

So far, there haven't been any surprises in ongoing operating costs. In fact, Liz Claiborne Inc. has seen hardware prices drop. The company feels confident that with the completion of the project, the Y2K issue will not be a threat and that it will see a significant increase in operational effectiveness.



afforded more rigorous operating procedures. Politically, this may be the best compromise for the IT organization if the LOB executives are balking at full re-centralization of servers and data storage.

After co-location, server consolidation can take the form of a **cluster** of servers. IDC has identified four types of clusters. 1) A *high availability cluster* is designed primarily to provide fail-over in the event of component failure. 2) An *administrative cluster* brings together a collection of servers for the sole purpose of easing administration. Applications still run on a single node but are easier to administer because of the cluster's systems management software. 3) An *application cluster* brings together ERP products, such as SAP/R3, to better manage the integration of the packaged software components. 4) *Scalability clusters* are designed to increase the capacity of a system by spreading the workload over several nodes. IT management needs to review these four possibilities for consolidating servers with an eye to improving service to customers.

When servers are consolidated, it is common to prepare a service level agreement (SLA) between IT and LOB managers. SLAs delineate which IT services will be provided and at what cost. Moreover, because costs can be estimated for different levels of service and lines of business, an enterprise can now rank its IT investments and make decisions about tactical and strategic investments that align with business goals. For an IT department, **service level management** is the measure of the level of excellence the department has attained in the eyes of its customers.

IT managers should pay special attention to the translation of IT metrics into corresponding business metrics. Although an IT department can deliver 90% availability at a lower cost than 99.99% availability, these cost savings must be linked to business issues. In this case, for example, the relevant question for LOB managers is, "What will be the impact of downtime on our business?"

A thoughtful answer to this question would address many factors, including customer service, lost productivity of workers, the potential for lost sales and lost customers, and the net impact on the bottom line. Careful consideration of these issues is critical if the SLA is to serve as a meaningful contract that leads to an efficient enterprise.

The architecture of any **storage system** will in turn depend on the architecture of the servers. In a recent study which it conducted on storage consolidation, IDC identified three strategies for the deployment of disk storage systems within an enterprise: decentralized server-dependent storage, co-located server-dependent storage and enterprise storage.

With decentralized server-dependent storage, each disk storage system is attached uniquely to a single server, and the processing and storage hardware is dispersed geographically. In the case of co-located server-dependent storage, the processing and storage hardware resides in a single data center, but each storage system is uniquely connected to a server.

Enterprise storage is quite different. An enterprise storage system consolidates enterprise data and provides access to that data from mainframe systems as well as Unix and NT servers. Enterprise storage architectures are well suited to the server clustering concepts previously mentioned.

Hewlett-Packard

A period of data center consolidation

Hewlett-Packard's Americas field operations consisted of 26 data centers scattered throughout North and South America, each maintaining its own order management and support systems.

However, system redundancies and the increasing complexity of enterprise-wide implementations were driving IT costs up at an annual rate of 18%. The IT organization was outgrowing its infrastructure.

To increase the organization's service levels and to control costs, Hewlett-Packard began a systems consolidation project. Initially, the project called for combining 26 data centers into six centers. It also called for these six data centers to eventually be moved to a single center in Atlanta.

Hewlett-Packard's 28,000 square foot facility in Atlanta provides 24x7 support for nearly 900 HP servers. These 900 servers include 600 in-house and 300 remotely located across the Americas.

The Atlanta Data Center handles all order processing, pre- and post-sale applications, Windows NT account administration, and e-commerce support for Hewlett-Packard's Americas operation. It supports more than 20,000 users in 220 field offices and processes more than 750,000 batch jobs per month.

In addition, more than 11 terabytes of data are stored on a variety of storage systems, including 300GB and 600GB optical storage systems, EMC Symmetrix, HP AutoRaid, HP high-availability disk arrays and HP high-availability storage arrays. Furthermore, Hewlett-Packard manages its operation with only five operators per shift.

Additionally, what Hewlett-Packard has now is a true high-availability environment with built-in system redundancies. Mission-critical system CPUs, disks, LANs and power supplies have mirrors or backups to minimize downtime, and, in case of a power outage, the data center is equipped with six turbo generators and enough fuel to continue operations for three days.

Indeed, after a major tornado ripped through Atlanta, there were only two buildings in the city that escaped power interruptions: the hospital and the Hewlett-Packard data center.

Hewlett-Packard received a quick payoff for its Atlanta Data Center consolidation. In the first year of operation alone, the consolidation resulted in nearly a 20% IT cost reduction. In subsequent years, the decrease in IT costs went from 18% to 3%. Furthermore, application rollouts that had previously taken 18 months to implement can now be done overnight.

"The forces driving consolidation are really the same issues that our customers face every time an IT decision is made," says Bill Russell, vice president and general manager of the Hewlett-Packard Enterprise Systems Group. "On one end of the scale, it's the level of service. On the other end are the costs of providing that service.

"And what makes the systems consolidation so appealing," continues Russell, "is that when it's implemented well, you can significantly improve service levels and lower costs at the same time."

The success of the Atlanta Data Center heralded a series of subsequent systems consolidations for Hewlett-Packard. Beginning with 153 data centers across the world in 1989, Hewlett-Packard has reduced the number of its global data centers to just ten over the past decade.

Advances in both telecommunications and Hewlett-Packard systems have made a centralized computing environment a cost-effective solution for companies that want to rethink their IT infrastructures to eliminate redundancies. "Since we developed our own operations center, we are better able to serve our clients because we have practical, real-world experience," says Bob Walker, vice president and general manager of Hewlett-Packard's Professional Services Organization.



...works [...] the heart of [...] Given this vital role, it is no surprise that [...] managers are conservative when it comes to accepting [...] technologies, new equipment suppliers, and new service providers into their networks.

In a recent study, IDC interviewed data center and storage managers who had taken the enterprise storage approach as a part of re-centralizing systems. These managers reported an interesting mix of costs and benefits when contrasting decentralized server-dependent storage with enterprise storage. Most dramatically, they estimated that enterprise data consolidation increased the amount of data that an administrator could manage by a factor of 7.5. (Granted, the salary for that employee is likely to be twice the salary of an individual capable of managing decentralized server-dependent storage systems. This reduces the labor savings to a factor of 3.75.)

In addition, the cost of enterprise storage systems is approximately twice that of server-dependent systems. Still, once all these numbers are brought together, IDC concluded that the total cost of storage is lower for consolidated enterprise storage systems due to increased management efficiency. Compared with server-dependent storage, properly implemented consolidated enterprise storage can dramatically reduce the cost of managing storage while improving application availability, avoiding costly losses of data and adding business value.

Although the possibility of reducing storage costs threefold is a compelling tactical reason for consolidation, there are strategic considerations that may be more important. Information has increased value when it is shared across the enterprise. For example, the consolidation of storage is a crucial step toward enabling data warehousing to be implemented efficiently.

Manufacturing industries may discover that opportunities exist in integrating product data management systems with marketing systems. In the retail and financial services industries, data mining may uncover important trends in data warehouses filled with detailed transaction data. IT managers would be wise to consider the strategic consequences of providing shared data to the enterprise. For all industries, unified data has a concomitant need for reliability and performance that is best provided by an IOD facility.

Halting software proliferation

Once they have established a strategy for server and storage consolidation, many organizations have found that a review of software can bring them major opportunities for savings. In many organizations, software tends to proliferate; products are often added because of one particular function in a suite or because of disparate LOB purchasing behavior. Software vendors often compete by adding functionality in new versions of their products that overlap or duplicate those of their competition.

When a software manager takes a step back and considers the technical offerings of all installed products, he or she is likely to uncover functional duplication. Each separate product requires continued attention from technical programmers and continually increasing maintenance fees payable to the independent software vendors.

The duplicate functions that can be quickly eliminated are usually in varying versions of systems management software and middleware. Duplication occurs when different areas of the company adopt multiple point solutions for items such as backup. Adopting a single software platform greatly improves the adminis-

Transco

Mandate creates need for new architecture

a privatized natural gas utility in the U.K., Transco provides a gas transportation system and owns and operates the entire 267,000 km of the UK's gas pipeline.

In March 1996, shippers other than British Gas became able to use the Transco network. Since this happened overnight, by government mandate, Transco needed a new IT infrastructure as soon as possible. Since it was one of the first utilities to encourage supplier competition, the road ahead was uncharted and a matter of keen interest to politicians, citizens and members of the utility industry.

New systems are usually designed with scalability in mind; the new billing system at Transco was no exception. Following a government decision to deregulate parts of the gas utility industry, Transco was asked to create a customer billing system that could initially handle industrial and commercial customers, with residential customers to come later.

(The reason for this is that there are 26,000 industrial consumers and 500,000 commercial users, but 20 million residential customers. Transco's system, called UK-Link, needed to scale by a factor of 40.)

Another system requirement was high availability. According to Paul Hastings, service delivery manager at Transco, data center operations needed to be 24x7 and for many of those hours, 1,500 customer support reps would depend on the system to provide information about meter readings, gas usage and billing.

In 1995 Transco put ont to open bid an order for a system that could meet current and forecasted capacities and could offer high availability and disaster recovery. To speed development, bids had to be based on off-the-shelf technologies, and not custom solutions or next-generation products.

These demands may seem severe, but all of Transco's business is predicated on this system. Without UK-Link performing as specified, Transco could not bill customers or provide account details to providers of gas transported by Transco. In short, it would not be in business.

Hewlett-Packard was chosen because it could identify proven off-the-shelf technologies, and because it was committed to working with the other key players. Its Professional Services Organization defined architectural choices for Transco and participated in the design of operational procedures, the integration of Hewlett-Packard technology with that of other providers, training and systems testing.

"Because of the complex technology, the high political profile of the implementation, and the time pressure, we had tn have a supplier whom we could regard as a trusted partner," says Angela Sadler, UK Link project manager. "We knew sometimes we'd need access to that company's highest levels. Although technology was important, wn were seeking someone with the right mindset to work with us on this project."

The system went online in March, 1996 in support of industrial and commercial users. At that time, the application was supported by ten HP 9000 servers and was used by about 200 customer support reps. In April the system was expanded to support more than 500,000 residential users, and in March 1997, the system was scaled to include another 1.5 million residential users. This was accomplished by upgrading two of the HP 9000 servers.

The final system, which scaled to support more than 19 million users, is supported by 48 HP 9000 servers. Of these, 18 support production, 12 are in production support, testing and maintenance roles, six handle middleware routing and 12 servers support development and enhancement of the application.



Two Worlds of Enterprise Computing

tration of the backup function. In particular, systems management software can be a target for rationalization. One soft drink maker was able to eliminate significant duplication by consolidating its systems management software. In other cases, consolidation has in turn created the opportunity to renegotiate site licenses and to reduce costs.

Duplication also creates more work for the company when the systems are incompatible. Different divisions in corporations may have overlapping applications, such as payroll or HRIS. Even within the IT organization, different data security platforms may have emerged to address different platforms. Such situations are a barrier to excellence within the enterprise IT infrastructure. As part of the overall review, the IT department should establish common standards for all software (to the maximum degree possible), and the standards should be aimed at improving interoperability of systems and sharing of data among related business applications across the enterprise. Doing so has the added value of simplifying software contract management and the administration of concurrent usage licenses as the number of servers is reduced.

Today's networks form the heart of much of the real world of business. Given this vital role, it is no surprise that IT managers are conservative when it comes to accepting new technologies, new equipment suppliers and new service providers into their networks. Basic characteristics such as reliability, interoperability and throughput take precedence over the often more hyped future "visions" or performance maxims. What is proven to work adequately takes precedence over what has a chance to work wonderfully. What works when



By IDC Analyst Dr. Henry Morris

Two Worlds of Enterprise Computing

In most enterprises today there are two worlds of information systems. Daily operations are managed by transactional applications, while decisions are informed by analytic applications.

Transactional applications mirror the daily business processes of the enterprise and capture immediate information about a customer's order, the recently discounted price of a product, current personnel at a field office or the amount of an invoice. Analytic applications, supported by data warehousing and information access tools, discover business trends and model alternative actions. They can identify new trends in customer ordering, forecast the effect of a discount, or estimate the skill mix needed to staff a help desk as customer buying behavior changes.

More and more, transactional data is collected in the process of conducting business. Analytic systems convert that trail of operational data into forecasts and trends that have implications for ongoing operations. However, moving the results of analytic systems forward into transactional systems is not an automatic process—at least not today. Over the next five years, transactional and analytic applications will be more closely coupled to each other and to business processes, as three trends unfold:

- **Enterprise application vendors begin to integrate transactional and analytic products initially in functional areas such as financial systems, customer support and aspects of retail operations.**
- **Suppliers aim for functional areas that cross industry boundaries to address larger markets. An even larger market awaits suppliers who integrate customer-facing applications.**
- **Commonality in underlying data models and in user interfaces will become a key enabler to the integration process. Component-based development environments targeting Web-based [illegible] are a key to providing consistency for users.**

Telia

Deploying a Web/server architecture

within Telia, the Swedish Telecom and the largest telecommunications company in the Nordic countries, Telia IT-Services outsources telecom and datacom solutions to corporations.

Recently, a large chemical company wanted to optimize manufacturing and logistics for its entire enterprise by moving from an inefficient collection of information systems to an integrated architecture. In particular, it wanted an ERP application that could be the basis for improved efficiency for its continuous manufacturing processes.

The chemical company was concerned with reliability, availability and scalability. It planned to outsource operation of the system, so Telia IT not only took part in the development process, it also proposed to operate the system on an ongoing basis.

"This is a typical client," says Niklas Gunnebrant, manager of business development for Telia IT. "European companies have embraced the need for highly integrated information services and the value in leveraging ERP packages. These companies expect the system to be solid and available, and as an outsource provider, we must make sure to keep that promise."

Telia IT responded with a proposal for a Hewlett-Packard Enterprise Systems platform. Telia IT has a history of partnering with Hewlett-Packard, having worked together many times to help customers migrate to high-performance HP Unix servers which support client/server or Web/server architectures. Like the chemical company, most of these customers were saddled with legacy systems, centralized and proprietary architectures, and poor information-sharing.

Says Gunnebrant, "It is typical for Hewlett-Packard to assist us in choosing and in configuring platforms to the varying needs of customers." For this project, Telia IT and Hewlett-Packard worked through the chemical company's requirements to specify three HP 9000 K570 enterprise servers.

After evaluating many ERP packages, the client selected one called IFS Applications from Industrial & Financial Systems Corp., a supplier of software for small and mid-sized enterprises. The IFS ERP system covers manufacturing, distribution, financials, maintenance, resource management and engineering. The vendor IFS was chosen in part for its Web gateway that allows users to access the systems with browser-based client workstations. The IFS package was installed without any modification.

The system employs two HP 9000 K570s in production and a third machine ready as a hot backup. The system, which is designed for 99.95% availability on a 24x7 basis, uses Hewlett-Packard's MC/Serviceguard software, which links servers in a cluster and monitors all components. If there is a failure of a component, the software transfers the load to an alternate server. MC/Serviceguard also supports realtime maintenance and disaster recovery functions.

The architecture is Web/server, a client/server architecture using Web technology to connect the client workstations. Remote access is handled through standard browsers and TCP/IP internetworking. While Telia IT operates the server side of the system, the customer maintains the workstations and an intranet. From Telia IT's data center, the system supports the customer's remote sites in other countries, which communicate via the Internet.

The project was delivered by Telia IT on time and on budget. The system went live on Sept. 15, 1998 and is being used by many professionals within the enterprise environment throughout the customer's organization—including the logistics, financial and manufacturing areas.

If your goal is to	Take the actions below	and explore these new technologies
Consolidate technologies	Reduce the number of protocols, interfaces, devices, management systems—and equipment suppliers and service providers.	IP-only routers; Layer-3 switches; multifunction remote office devices; declining use of token ring and FDDI; Web-based management systems
Improve functional integration	Identify and investigate boundaries between categories of service, e.g., LAN vs. WAN, voice vs. data management, routing vs. switching, dial vs. dedicated telephony.	ATM LAN and WAN connectivity; Layer-3 switching; combination router/remote access devices; server switches with load balancing; voice over IP
Improve performance	Identify and schedule, if possible, the most demanding applications. Align speed of WANs to match LANs in performance. Balance the performance of desktop client machines, shared servers and their networks. Improve intranet server access.	LAN switching; 100M and Gigabit Ethernet; OC-3/12/48/etc. ATM; ISDN-DSL-cable modem movements for remote users; 56K modems; server clusters/farms; quality of service features
Improve use of the Internet	Explore alternative WAN service providers. Identify key business information sources. Provide controlled access to the Internet with gateways and firewalls joining internal networks that support the user population. Consider outsourcing to Internet service providers the provisioning of networking equipment to smaller offices and telecommuting workers.	Higher-performance IP LAN and WAN switches; low-cost IP routers; Web-based management systems; special-purpose intranet servers; browser-based applications; high-capacity remote access client and server solutions
Increase support for small sites and single user networking	Explore leading-edge technologies that enable the management of critical data outside central sites. Minimize increases in scale (number of users/devices) and the scope (number and location of sites) of networks. Engineer for improved reliability and security.	Low-cost switching and routing solutions; multifunction LAN devices offering hub, switch, router and voice functions in one box; automated configurations; remote Web-based management; higher-speed access further out on the network, i.e., via ISDN, DSL, 56K modems

If your goal is to:	Take the actions below	and explore these new technologies
Avoid dependencies on VARs and distributors	Strengthen partnerships with networking suppliers. Buy equipment from more than one equipment manufacturer. At the same time, avoid the integration burdens caused by too many suppliers. Demand discounts and insist on participating in new product development discussions. Make service a top criterion for retaining a supplier.	Modular systems; reusable components; easy-to-use management systems; lower-cost devices such as $500 routers and $50/port LAN switches
Drive network investments with business objectives	Establish a formal and comprehensive justification process for network upgrades. Increase emphasis on remote sites and users, if appropriate. Focus operating budget on tactical near-term (vs. strategic long-range) requirements.	Cafeteria-style pricing and packaging (modular systems, multifunction systems); smooth yet dramatic upgrade paths; trade-in allowances; consideration of secondary market as a worthy alternative
Improve accuracy of costing	Avoid simple price-per-port acquisition calculations. Include the ongoing costs of support and staff training as a part of operating expenses. Investigate the cost and ease of future upgrades.	Common components and management systems; 100M and Gigabit Ethernet; intelligent switching; automated configuration/diagnostics; proactive management functions (e.g., modeling, simulation); ready upgrade paths (using ASICs, modular designs, software)
Improve interoperability	Streamline access to legacy systems. Avoid taking on new technologies. Select standard packages and solutions from trusted suppliers. Focus on standards. Make systems integration capability a high priority in selecting new products.	100M and Gigabit Ethernet; LAN switching; high-performance IP developments; "certified" solutions; modular designs; technology integration; solutions based on supplier partnerships, alliances, mergers, forums
Provide pervasive and high-availability access	Invest in high-quality remote access devices. Exploit redundancy to avoid single points of failure. Simplify information flows and access choices.	Wireless services; ISDN-DSL-cable modem developments; size reductions; downward price pressure; WAN performance/reliability gains; internet as alternative access method; easy-to-access solutions



Establishing a common backup and recovery system will significantly lower costs while decreasing the likelihood of lost data—a win win proposition

plugged into a real existing network is more important than any potential use within a network "island."

Still, IT managers must push forward to meet network requirements for greater reliability, improved performance, broader reach, lowered staffing levels and more cost savings. How can they do this while maintaining order within their networks? By:

- Reducing the complexity of their networks by using fewer protocols, network technologies, circuits and even suppliers.
- Looking for more functionality in a smaller number of specific network devices. This both improves the flexibility of IT's equipment and lessens IT managers' budget and management burdens in terms of acquiring and operating their network.
- Throwing extra bandwidth (such as ATM and Gigabit Ethernet on the LAN or upgrading to ATM or T-3 lines for the WAN) at any and all network performance problems. Although this may seem like an extravagant response, it actually addresses the network manager's need to keep things simple.
- Leveraging Internet-related technologies (e.g., IP push/pull, browsers and Web servers) and services (e.g., virtual private networks) into their private intranets to take full advantage of all the development activity, support resources and expertise centered on the Internet.
- Analyzing the true cost of operating their networks more carefully. This involves far more than price-per-port calculations. It requires management to determine the TCO for the networks.

Of course, this flurry of activity takes place in the often dark shadow of restrictive operating budgets, installed systems and uptime requirements. These networking issues are further discussed in the chart that appears on pp. 12-13.

Keeping staffing problems in check

CIOs are aware—painfully so—of the staffing problems that arise from the increase in the number of systems and solutions implemented. Reducing the number of locations, systems and platforms has immediate staffing consequences, and adoption of enforced software standards can reduce the skills required for operation. Help desk and technical programming staffing are directly related to the number of hardware and software products being supported.

Outsourcing work that uses infrequently needed skills can further simplify staff skill requirements, as well as reduce the number of common processes and procedures. For example, establishing a common backup and recovery system will significantly lower costs while decreasing the likelihood of lost data—a win-win proposition. Farming out non-strategic commodity services, such as broadband network services, long-term archival storage and off-site data backup, will also raise efficiency, since outsourcers specialize in these functions and can achieve economies of scale.

Staffing needs in an IT department have always grown in direct proportion to a firm's deployment of IT systems. The more automation, the more servers, storage devices and networks. Every server's operating system and middleware demands support from more technical programmers. A reduction in the number of servers, combined with a review of software that contains duplicate functions, will streamline productivity.

American Stores

Retailer's thrifty view undergoes change

In the business environment has become a key success factor for companies on the cutting edge of retail services.

With information that they gather from preferred customer card programs, not only can retailers make better decisions on purchasing and distribution, but they can also tailor inventory in order to offer more effective and more targeted promotions.

With $18 billion in sales and more than 1,800 stores in operation throughout the country, American Stores lays claim to being the second largest food and drug retailer in the United States.

American Stores has more than 20 million people enrolled in preferred customer card programs. If half of these customers were to shop each week, and they were each to buy 10 items, the company could expect to collect 100 million new pieces of point-of-sale information every week. Currently, American Stores has a data warehouse that contains more than 1.5 terabytes of information, and the corporation's IT department anticipates that its storage needs will more than double in the coming year.

The huge processing and logic load in moving such large amounts of data into the data warehouse, combined with the need to quickly access and analyze the point-of-sale information from all 1,800 of its retail stores, were what drove American Stores to consolidate its data server technology on a single platform.

Consolidating the data warehouses, the corporation realized, would give it much faster access to centralized information on sales, customers, vendors and stores. But this type of consolidation would lead to other benefits. It would significantly reduce operational costs. It would also eliminate the complexity and reduce the amount of time that the IT department used to spend dealing with the idiosyncrasies of multiple servers from four different vendors.

"We didn't have enough raw technical talent to support all these boxes," says Larry Ames, who serves as director of technology planning for American Stores. "Being in retail, we have a thrifty view of the world. It was a 'do a better job with what you have' kind of scenario."

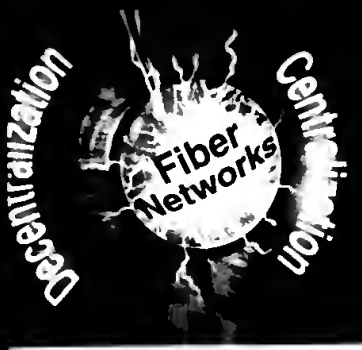
However, all that changed when the corporation decided to consolidate its servers. "The Hewlett-Packard server consolidation let us cut costs and bring new, faster solutions to the business," says Ames.

The company settled on using an 8-node HP 9000 K570 EPS cluster for its custom-developed Informix-based data warehouse and a 2-node HP 9000 K460 EPS cluster for development.

Moving to a Hewlett-Packard solution gave American Stores a single platform on which to build its data warehouses, as well as the opportunity for deploying a scalable solution to meet its growing data mining needs.

Says Ames, "We made the decision to consolidate the data warehouse applications on Hewlett-Packard because we believe they are a thoroughbred in this area.

"We have a mission to become expert ourselves in data warehousing," he adds, "because the use of data is a key strategy for American Stores to achieve its business and financial objectives."



In 1999 the ability of fiber networks to deliver resources over distances without penalty and the need to provide IOD to IT consumers have swung the pendulum toward a reconsideration of centralization

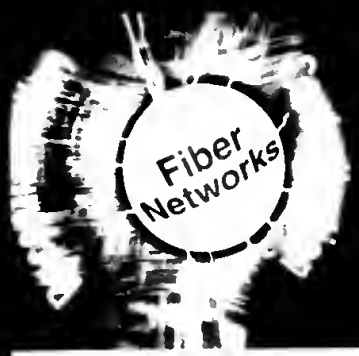
By IDC Analysts Trac Gere and Doug Chandler

Mission-critical Service and Support

But in certain cases adding software, in particular systems management software will improve functionality at reduced costs This result is achieved because systems management software permits database and application specialists to offload basic repetitive management tasks to computer operations personnel With all three areas of IT using the same management software what was previously highly complex becomes more manageable and less demanding on the part of all involved, and in the meantime SLA goals are improved

Although improved systems management software may reduce the number of operators the consolidation of servers is guaranteed to reduce staffing demands In the future, a few, more skilled operators will manage a simpler consolidated data center Although each operator will command a higher salary, the bottom line will show significant savings

With the elimination of multiple hardware components and a reduction in the number and variety of software products, further opportunities will emerge for streamlining the number of IT staff members and the breadth of knowledge that these persons must have Such streamlining carries advantages By supporting fewer products fewer technical programmers would be needed to spend time mastering the installation intricacies and the operational issues regarding compatibilities with other software products Furthermore staffing a help desk is difficult because of the number of technologies that need to be supported But having fewer technologies to master inside the enterprise would lead to a more efficient and responsive help desk, one with a more complete understanding of those technologies that are supported



In 1999, the ability of fiber networks to deliver resources over distances without penalty and the need to provide IOD to IT consumers have swung the pendulum toward a reconsideration of centralization

By IDC Analysts Traci Gere and Doug Chandler

Mission-critical Service and Support

Driven by the extension of the enterprise to customers and suppliers via the Internet, organizations are ushering in the era of extended enterprise operations. At the same time, they are struggling to balance their lowered tolerance for downtime against ongoing cost concerns. They want the reliability and performance of the data center delivered in distributed and Internet computing environments.

For service providers, this means delivering a set of services that address an organization's need for availability across its IT environment. It also means delivering services over an extended timeframe, rather than in reaction to a single event. For providers moving from a legacy of reactive support, this means going beyond traditional field maintenance and phone support services to a full range of planning, implementation, support and management services.

The traditional response by service providers to customer needs for high availability has been to beef up support services, primarily by reducing the time required to respond to a problem in the field. In this new era, however, services must be redefined to encompass systems, networks and applications. Providers must assure continuity even when a problem occurs and must differentiate themselves via contracts based on availability and performance, beyond mere response times.

A key effect of the Internet is that organizations' connections with both customers and suppliers will become mission-critical. Increased Internet mission-criticality will lead to growth in the market for mission-critical Internet Operations Management services. This market is growing rapidly, with a five-year CAGR of 69% through 2002.

Also, an increasing proportion of desktop management and network management services will become mission-critical as customers expect availability and performance criteria to be part of their contracts.

Telstra

Providing top-of-the-line Internet service

businesses, the Internet is no longer a novelty; it's a necessity. In the past few years, dependence on the Internet, e-mail, e-commerce and intranets has increased...as has consumer desire for faster, more reliable Internet access and for continuous online access without tying up a phone line.

Telstra is the largest telecommunications carrier in Australia, providing telephony, cable television and Internet services. Its Big Pond Cable (BPC) service provides high-speed Internet access to 1.6 million customers in Sydney and Melbourne through its existing hybrid fiber/coax (HFC) network.

Telstra's HFC network has provided infrastructure for pay TV since 1995. When Internet usage rapidly accelerated, Telstra began developing an Internet service system to make fuller use of its cable network. In May 1997, the BPC system came online in Sydney and Melbourne.

Of the 600 to 800 ISPs in Australia, only BPC offers telco-grade service to residential Internet users. BPC customers are always online without tying up a phone line, they have continuous e-mail, and they enjoy transmission speeds 100 times faster than conventional dial-up.

BPC charges for Internet access not by time, but by amount of data transferred to or from a customer's PC. Because BPC users are small businesses and individuals logging in from home who want 24x7 availability and fast transmission, they'll pay a few dollars more per month to have direct, continual access.

Telstra's requirements were functional, e.g., response time and performance. It described its needs to vendors in terms of number of customers, amount of Web traffic, number of customers reading news and using e-mail, and expected volume of information up- and downloaded. "We weren't interested in the underlying hardware," says Glen Law, national manager, Internet Services, adding Hewlett-Packard's solution was selected because it best met Telstra's requirements for a minimal-risk solution that answered its concerns: reliability, scalability and flexibility.

BPC also sought a supplier with principles similar to its own. Hewlett-Packard has a large, Australia-based organization and local expertise, understands the local culture and has a reputation for following through. "Hewlett-Packard settled in Australia for the long run," says Phil Sykes, national general manager, Internet IT Product. "They're not likely to cut corners because they know they'd have to deal with problems later."

The project met Telstra's goals. Its schedule was aggressive—12 months from specs to deployment—but Hewlett-Packard met all of Telstra's milestones and completed the project on time and on budget.

Telstra's BPC group bases its service on Hewlett-Packard's Broadband Internet Delivery System (BIDS), an integrated server complex that handles Internet connectivity, content storage, firewall security, and network and subscriber management. BPC's architecture consists of network server complexes in Sydney and Melbourne. Each site has seven HP 9000 K-series servers in production, plus another one offline for testing and validation.

The platform supports a billing system, service management systems, network management, an Oracle customer database, and a Netscape proxy and work server. The HP BIDS system is the glue that holds everything together. Its key advantage is availability. "Hardware isn't the whole story," says Law. "Availability is a combination of design and support systems and processes."

BPC is working on improving security. It wants to expand its business to the corporate desktop market, and security must be bulletproof to attract corporate customers.

Wells Fargo

How to manage a vast enterprise network

diversified financial services company. Since 1852, the Wells Fargo stagecoach has been a symbol of reliable service across the American West.

Today, Wells Fargo aims to provide efficient, personal and responsive 24x7 service by connecting its customers to essential financial services by ATM, telephone or personal computer, as well as through a growing network of traditional and supermarket branches. Following its recent merger with Norwest Corporation, Wells Fargo now has $196 billion in assets and more than 100,000 employees.

The IS team in the company's wholesale money management group manages 3,000 desktops. As the number of desktops remains constant, this department expects to reduce the number of servers that they use to manage the corporate network from 172 to 158.

This reduction in the number of servers will be made possible through the use of more reliable hardware, plus the sophistication of management tools such as OpenView from Hewlett-Packard. At Wells Fargo, 100% of the servers and 20% of the desktop computers are managed centrally.

Connecting all the desktops at Wells Fargo is a very large enterprise network consisting of 4,500 routers and 8,000 hubs. The network management upgrade resulted in a 60% to 80% decrease in staff time required for installation and upgrades, network troubleshooting and repair time, and time spent on normal desktop management.

In other areas, including server operating system support and system tuning, user support/help desk, server setup and configuration, and disk management, file management and database management, requirements for staff time were reduced by at least 20%. In addition, there was a significant increase in network availability.

The scalability of Hewlett-Packard's OpenView management tool was particularly applicable to the situation at Wells Fargo. The bank grew its network extremely rapidly from 200 branches, when it first installed OpenView, to more than 1,700 just prior to the merger with Norwest.

Today, the company has thousands of hubs and routers installed. The network managers at Wells Fargo believed that the Hewlett-Packard management solution was the best one for the task at hand. Furthermore, since having completed the implementation, they also believe that the OpenView product has more than paid for itself.

Wells Fargo is a major user of Hewlett-Packard's management tool, with virtually every tool installed. The bank particularly likes the fact that Hewlett-Packard's APIs can be customized by the user to meet individual requests, such as having alarms sent along with suggested actions.

Wells Fargo has found that Hewlett-Packard hardware and software are both excellent investments, and the bank is highly pleased with the responsiveness that Hewlett-Packard has shown to all its service needs.

COMPUTERWORLD

Reprints of the supplement can be ordered through Heidi Broadley at (508) 820-8536 or she can be reached via e-mail at heidi_broadley@cw.com.

Questions or comments on this supplement can be forwarded to managing editor Peter Bochner at (508) 820-8289 or peter_bochner@cw.com.

Conclusion

Ten years ago, the pendulum was swinging in the direction of decentralized architectures, driven by the birth and rapid maturation of microprocessor-driven computing and the need to move resources closer to users. In 1999, the ability of fiber networks to deliver resources over distances without penalty and the need to provide IOD to IT consumers have swung the pendulum toward a reconsideration of centralization.

A company cannot achieve IT excellence by acting alone. Movement toward a consolidated corporate IOD facility will require the cooperation of many parties, not the least of which will be the major vendors currently installed in the enterprise. All vendors will seek to influence the IT executives in order to maintain, and potentially grow, their installed base. Suppliers to large enterprises are aiming to deliver systems that provide IOD, and IT departments are partnering with these suppliers to undertake consolidation projects.

However, IT executives will need to exercise care in partnering with vendors. The wise IT executive will assess each vendor's business and product strengths as well as their customer orientation, and will ask the following questions:

- How do the products rate in terms of functionality, reliability, scalability and performance?
- Is the vendor's development strategy for future products a clear one? Do they have a track record for delivering on strategies? What are their financial and market strengths? How does their product and service breadth fit into the user's strategic drive for excellence?
- Will the vendor provide installation and product support during consolidation, as well as ongoing service and support through the vendor help desk and online documentation?
- How responsive is the vendor to the user group's recommendations for enhancements and fixes?

The bottom-line question is: Can CIOs partner with a vendor and make a corporate marriage that will stand the test of time while attaining the excellence the company seeks? Successful partners are those who provide a full line of services and integrated products (directly or with partners) and who are willing to share in the risks of consolidating mission-critical systems.

Excellence is not achieved in a single project or over a short period of time. The pursuit of excellence is a way of life for the IT executive. Continuous improvement and refinement of IT technology's infrastructure for the benefit of the enterprise's bottom line require a continuous review of emerging technologies and, when appropriate, their adoption and integration into the business life of the corporation. ❖

The principal author of this White Paper is Thomas Dieson, who brings years of MIS experience to his role as Research Director of IDC's IT Advisor, a one-stop research and advisory service that provides IT decision makers with practical advice and innovative tools to help them make the best decisions and save money. In his role, Dieson focuses on the management of the IS function. He brings an understanding of how IS relates to the enterprise and the financial impact of IT on client companies. He can be reached at tdieson@idc.com.

Other IDC contributors to this White Paper included Dot Allen, Doug Chandler, Traci Gere, Martin Hingley, Steve Josselyn, David King, Susen King, Mark Leary, Dr. Paul Mason, John McArthur and Dr. Henry Morris.

IDC provides analysis, advice and custom consulting to the world's leading IT suppliers as well as the foremost user organizations. IDC's global network of 500 analysts in more than 40 countries uses the most rigorous standards, definitions and methodologies to deliver authoritative intelligence on global IT trends, markets, products, vendors, pricing and geographies.

The next E. E-services.



www.hp.com/e-service

© 1999 Hewlett-Packard Company

BUSINESS

NET SAVES

Superstores like Office Depot and Staples almost forced the demise of office products retailer Jacobs Gardner. But the $20 million company types on, thanks not only to catalog sales, but also the Web, which will account for 25% of sales its first year. ▸ 44

ADS FOR A NEW GENERATION

Companies advertising on the Web to reach teen-agers are using virtual-reality product tours and offering free merchandise for viewing commercials. ▸ 50

DEVELOPER COMMUNITIES

Online communities for software developers vary in quality, but here are several that make the grade: Developer.com, Java Lobby and the "fan club" sites. ▸ 54

COUNTY TACKLES ONLINE BIDDING

Few states are rushing into online bidding systems because of concerns about digital signatures and the difficulty of handling complex bids online. But Orange County has seen a sizable increase in bids and competitive pricing. ▸ 50

THE LIFE OF A CONTRACTOR

Thinking of going off on your own as a contractor? Depending on your goals, the promise of better pay and picking your own assignments can be tempered by dated skills and the need to know how to manage your own business. So say three who have taken the plunge. ▸ 58

INJURED FILE CLAIMS ON WEB

Workers Compensation Fund of Utah has halved the time it takes to find out about subscribers' injuries with a Web-based claims system. That means it can quickly recommend treatments and rehabilitation for clients. That further increases effectiveness and lowers costs, executives said. ▸ 44

Y2K: TALK TO YOUR HELP DESK

Communication with your help desk is key when it comes to year 2000, whether you're scheduling system downtime to test fixes or upgrading users' systems. Keeping a centralized record of changes means help staff should be able to quickly fix glitches. ▸ 48

Y2K LIFE SUPPORT

The National Association of Manufacturing has teamed with two vendors to offer ready-made software that companies can use to keep essential functions going if their main systems fail because of year 2000 problems. ▸ 48

MORE

Business advice 59
Careers 54
E-commerce 44
Opinion: Peter G. W. Keen, 56
Year 2000 48



AUTHOR THOMAS FERRATT: "IT professionals need and want feedback

PICKING A PEOPLE STRATEGY

The IT labor shortage has spawned many creative techniques for retaining and recruiting technologists. In their new book, *Coping with Labor Scarcity in Information Technology*, researchers Thomas Ferratt (above) and Ritu Agarwal suggest tactics based on the kind of workforce that best suits your company's needs — for example, long-term, business-savvy employees vs. technology overachievers who stay only a short while.

57



Okay every ready Inte

We know that you know a *lot* about the Internet. But if you find yourself stumped by the following questions, it's possible there are still a few things about the 'Net that you *didn't* know. Care to find out? Then let's get started.

1. Who provides for the Internet Service Providers? For six out of the eight largest ISPs, it's Compaq. Fact is, hundreds of ISPs look to us for all sorts of things. From our affordable, scalable ProLiant™ webservers (the most popular on the market, outselling Sun by almost 2 to 1) to our blisteringly fast, clustered AlphaServers™ (the fastest webservers in the *universe*) running Compaq Tru64 UNIX™.

2. Who developed the first Internet firewall? It took some very smart people at our labs in Palo Alto to come up with this vital technology. Today, our firewalls protect critical information in thousands of businesses and government agencies. Our firewall technologies make it possible for you to safely connect your private network to the Internet, and enable you to turn the coldest of shoulders to vandals and thieves, while extending the warmest of welcomes to employees and customers.



Who helps businesses, from the smallest to the largest, use the Web to entice, lure and land more customers?

3. Who helps MSN.com™ and barnesandnoble.com have an Internet presence worthy of Microsoft and Barnes & Noble? These companies know how crucial it is to make a good impression on the Internet. Not coincidentally, they came to us for help with infrastructure and systems support. Today, their sites are among the busiest on the Web, with users dropping in for millions of page-views each day, but they're just two of the thousands of Web sites that our people and products help enable. (Can we enable one for *you*?)

4. Who's doing more to help the Internet really (and literally) hit home? We are. Here's a small sample of our home Internet technologies: simple, one-touch Internet access; affordable Presario® PCs that you can order broadband-ready, for ultra-fast access many times that of conventional 56K modems; and easy home networking solutions that let you connect multiple PCs using existing phone lines, and allow multiple users to access the Internet at the same time.

5. Who's using the Web to get more, much more, out of ATMs? With Compaq's NonStop® mission-critical systems and solutions behind almost two-thirds of the world's ATM machines, what more is there to get? Well, how about airline tickets. Postage stamps. Virtually every kind of financial transaction. And more. In the near future, Compaq's Web-enabled ATM technologies, developed in partnership with CIBC, will dramatically expand your notion of what you can get out of an ATM machine.

Microsoft® Internet Explorer

Who helps Microsoft and Netscape help millions of people explore, navigate and love the Internet?



Who helps the leading aerospace companies use the Internet to take their businesses to new heights?

one, for the first annual rnet Quiz?

6. Who runs the most powerful and useful guide to the Internet? AltaVista®, which set the standard for search engines by finding relevant results as much as 100 to 200 times faster than its competition, is a part of Compaq. It's also a huge part of our core Internet strategy—providing us with a living, breathing connection to the Internet and its users every second of every day. What we learn there is every bit as important as everything else we do there. (And with traffic exceeding one billion Internet searches a month, we learn a *lot*.)



Which single button on a computer keyboard, and from which company, has introduced more people to the Internet than any other?

7. Who's got thousands of *human* guides to the Internet, to help you make it as simple as humanly possible? Right now, in 114 countries, the 27,000 people of Compaq Services are solving some of the toughest problems imaginable. With flexible, scalable, manageable solutions. Solutions for Internet/intranet/extranet. For network security. For e-commerce. For large companies and small. Fact is, as complexity grows, the number of reasons you need a great partner grows, too. And that's why we're here. To help you make the right choices, and chart the right path, today and in the years ahead.



Who can help you chart the best course through the immense complexities and limitless opportunities of internetworked computing?

How'd you do? If you got most of the questions right, you're probably one of our customers. If not, we're more than willing to work with you to help bring up your score. Call **1-800-AT-COMPAQ** or visit **www.compaq.com/betteranswers.** Where you'll find some very good answers to some very tough questions.

COMPAQ

Better answers.™

www.compaq.com/betteranswers

©1998 Compaq Computer Corporation. All rights reserved. Compaq is registered in the U.S. Patent and Trademark Office. Better answers is a service mark of Compaq Computer Corporation. AlphaServer, AltaVista, NonStop, ProLiant, Presario and Tru64 UNIX are registered trademarks of Compaq Computer Corporation. CIBC is Canadian Imperial Bank of Commerce. Microsoft, Internet Explorer logo and MSN.com are trademarks of Microsoft Corporation. Netscape N logo is a registered trademark of Netscape Communications. UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company, Ltd. All other names are trademarks or registered trademarks of their respective companies.

BRIEFS

Financial Site Targets Rich Investors

Former Securities and Exchange Commission (SEC) chief Steven Wallman and other investors have launched OffRoad Capital Corp. (*www.offroadcapital.com*), an online financial marketplace where individuals with more than $1 million in assets can invest in private businesses seeking capital. OffRoad charges a $1,000 initiation fee and $250 annual subscription renewal fee. High net-worth individuals represent about 5% of U.S. households, yet hold roughly 66% of its assets, according to SEC data.

E-Commerce in Europe

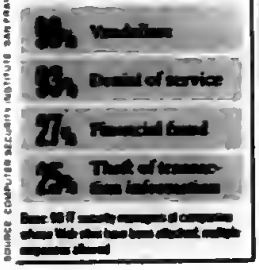
Pockets of Internet commerce among European countries, or "eZones," will develop, fostering both electronic commerce and a more unified market throughout Europe, according to a new report by Forrester Research Inc. in Amsterdam. Geography is key, meaning that eZones will typically form among countries that are close to one another. EZones might also occur among countries with similar regulations and trade policies.

Euro Used Online

Electronic commerce is one of the main areas to which users have begun to conduct transactions in euros, according to Europay International. Its analysis shows EuroCard-MasterCard holders have mainly used the euro to pay highway tolls and to purchase goods via mail, telephone and the Internet.

Web 'Hits'

What types of unauthorized access or misuse has your Web site experienced?



Base: 98 IT security managers of companies whose Web sites have been attacked, multiple responses allowed

SOURCE: COMPUTER SECURITY INSTITUTE, SAN FRANCISCO

RETAILERS SWAP STORE SPACE FOR CYBERSPACE

Dwarfed by superstores, some finding new life on the Web

BY STACY COLLETT

NOTHING STRIKES fear in the heart of a midsize retail store executive like the term "superstore." Penny Wise Office Products Inc. President Gary Luiza knows that feeling. Penny Wise's parent company, Jacobs Gardner Office Supply Co., once dominated the high-rent storefronts in Washington and New York.

But superstores like Office-Max Inc. and Staples Inc., with low-rent locations and rock-bottom prices, all but forced it to close its 33 stores in the late 1980s. The retailer had to take drastic measures.

Jacobs Gardner shuttered its stores and decided to sell its products online and by catalog exclusively. It also closed its warehouses and aligned with wholesalers that could ship its products. The company invested $1 million in servers from Gateway and integrated its electronic bulletin board software — which customers had used to purchase products electronically since 1990 — with iCat Inc.'s electronic-commerce suite.

> We took a unique leap of faith to go stockless and become more of a marketer of office products.
>
> GARY LUIZA, PRESIDENT, PENNY WISE OFFICE PRODUCTS



"We took a unique leap of faith to go stockless and become more of a marketer of office products," said Luiza of Penny Wise, the Bowie, Md.-based online and catalog spin-off of Jacobs Gardner.

Penny Wise represents a new breed of retailer — one that market forces would have put out of business in the past, but that now has a second chance on the Web.

Egghead.com Inc. is another company that took a similar leap from retail space to cyberspace more than a year ago. The Spokane, Wash., software retailer last year shuttered its 80 storefronts and went on to earn more than $100 million in online sales in 1998.

Penny Wise's Web site (*www.penny-wise.com*) launched last July and will account for 25% of the company's revenue by its first birthday, Luiza said. About 55% of the company's $20 million in annual revenue still comes from catalog sales.

Statistics on companies that moved operations largely online are hard to come by, but industry watchers said most companies won't be giving up their physical storefronts anytime soon. "There's only going to be a handful that try to cash in their brick-and-mortar assets," said Vernon Keenan, an Internet analyst at Keenan Vision Inc. in San Francisco. "Merchandising, at its core, requires touch with your buyers."

Observers said Penny Wise also faces tough competition in capturing a sizable share of the online office-supply market. OfficeMax.com was one of the top 100 Internet retail sites in 1998 and earned more than $12 million, according to ActivMedia Research Inc. in Peterboro, N.H., which tracks the top electronic-commerce sites.

Insurer Saves as Clients File Claims via Web

Faster notice of injuries also key to service

BY BARB COLE-GOMOLSKI

When the Workers Compensation Fund of Utah (WCFU) installed a system to let policyholders submit claims on the Web, the goal was to improve customer service. Little did the Salt Lake City-based insurer realize that the new system would also reduce claims costs by 20% in its first year.

With the Web-based system, policyholders can submit a Web form notifying the WCFU of a worker injury. About 45% of its 30,000 subscribers are using the application.

The WCFU is learning of claims a lot faster than when they were filed on paper. By finding out about injuries in an average of 10 to 14 days — and sometimes within minutes — rather than the old average of 28 days, the company can more quickly recommend treatments and rehabilitation regimens for clients, according to Bob Short, senior vice president of claims.

Without such recommendations, injured clients might visit several doctors and explore various types of treatments, a process that costs more and often results in less-effective treatments than those the WCFU can recommend, Short said.

"The faster we get notification, the less it costs us," said John Strang, vice president of information systems.

The Web application is a more efficient way to process claims, which could give the WCFU an edge over its competition, said Maitland Lammert, a financial services analyst at Edward Jones, a brokerage in St. Louis.

"Generally, insurance companies are bogged down in paper and have been slow to adopt technology," Lammert said. But as competition among insurers increases, that's changing, she said.



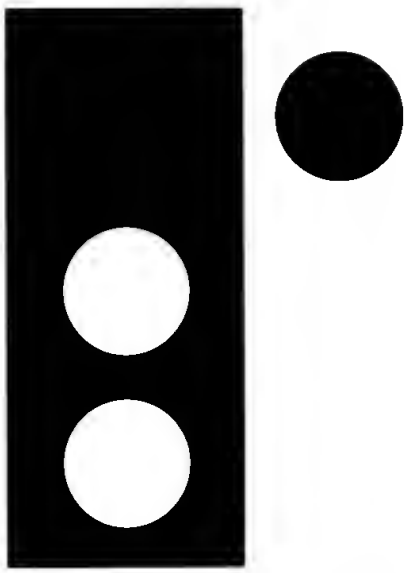
THE WCFU's JOHN STRANG: "The faster we get notification, the less it costs us"

Most large insurance companies are testing Web-based transaction systems but are being held back by mainframe-based billing systems without easy paths to the Web, said Yaron Benvenisti, head of application development at SPL WorldGroup, the San Francisco-based information technology consultancy that built the WCFU application. SPL countered that problem by writing a special interface that makes the host-based data browsable.

Because policyholders are accessing the transactional system via the Web, security is an issue. The insurer is currently undergoing a security audit to ensure that its firewall and other security measures are doing the job.

The WCFU's next step is to give agents price quotes online. "We think we can cut that cycle from days to five to 10 minutes," Strang said.

The insurer also might let health care providers submit forms online, luring technophobic doctors by noting that bills filed electronically are paid faster. "We look at this as one more thing that makes it easier to do business with us," Strang said.



Stop your legacy maintenance needs from affecting new systems development.

Legacy Maintenance outsourcing from IMRglobal.

imrglobal

the power of vision. the value of results.℠

SO I'M ONLINE WITH MY BROKER, AND MAKES GLOW-IN-THE-DARK ANYWAY, I NEED TO MAKE A THE MARKET'S ABOUT IT'S TIME FOR MY NAP. SO

GET AN E-MAIL CONFIRMATION,



AND THIS

HE LINKS ME TO THIS COMPANY THAT BICYCLE SPOKES. NEAT, HUH? TRADE QUICK BECAUSE ONE, TO CLOSE, AND TWO, I GO IN FOR 500 SHARES,

MORNING MY BROKER CALLS ME UP, AND GUESS WHAT?

I'M RICH!

HE'S YOUR CUSTOMER. HOW DOES HE FEEL, WHAT WILL HE DO? THAT'S UP TO YOU...AND ASPECT.



Every day, your customers seek you out in new ways. Over the phone. On the Web. By fax. And how you answer—how you define their experience—spells the difference between your success and failure. That's the importance of the call center to your business. It's also the competitive advantage we provide. We're Aspect, world leaders in helping customers and companies stay connected. For more than 12 years, we've defined the call center, with solutions that are open, reliable, and cost-effective. Ones that help companies boost sales, develop loyalty, and build long-term profitability. Because it all comes down to that one moment, when that one person makes the effort to contact you. And that's not a technological issue. It's a human reality. It's an experience...we make happen.

Call 1-800-381-9898, ext. 72, or visit www.aspect.com/cw for your FREE booklet *Defining the Customer Experience.*

Defining the Customer Experience

ASPECT

© 1999 Aspect Telecommunications Aspect, the Aspect logo and the phrase "Defining the Customer Experience" are trademarks and/or service marks of Aspect Telecommunications Corporation in the United States and/or other countries All other product or service names mentioned in this document may be trademarks of the companies with which they are associated

BRIEFS

Pa. Utilities Prepared for Rollover

Most of the state of Pennsylvania's power utilities are prepared for the year 2000 problem and expect no major power disruptions, according to a report prepared by Pennsylvania's Public Utility Commission. The report can be found at *http://puc.paonline.com/commissioners/year_2000.htm*.

Federal Medicare Provider Ready

Nationwide Mutual Insurance Co., the federal government's Medicare Part B carrier for Ohio and West Virginia, announced last week that its Medicare Operation has met the Health Care Financing Administration's 1998 testing requirements for year 2000 readiness.

Year 2000 Site Gets 7 Million Hits

Since its launch four months ago, a Web site that lists year 2000-compliance information on 100,000 products has received about 7 million hits, according to Electronic Data Systems Corp., the Plano, Texas-based information technology services giant that hosts the Vendor 2000 site.

The database offers year 2000-compliance details on products ranging from Otis Elevator Inc. elevators to Dell Computer Corp. hardware.

HELP DESKS LEFT OUT OF Y2K LOOP

Better handoff, communication needed to equip front lines for system glitches

BY STACY COLLETT

THE ROAD MAP to year 2000 compliance seems easy enough to follow: Find the problems, fix the problems, test the system, cope with glitches and recover. But most companies fail to include their help desk operations in planning for those "cope and recover" stages, according to market research firm Gartner Group Inc.

"Help desk people are responsible for implementation and maintenance. The piece that's been missing is the handoff from those that develop the changes to those who have to implement the change in a production environment," said Bill Keyworth, a Gartner analyst.

Keyworth said communication among departments and consolidation of help desk resources and information will bring help desk operations in sync with year 2000 projects.

Poor communication slowed help desk operations at Dow Chemical Co. in Midland, Mich. The networking, client/server, database and application groups each would bring the company's system down at different times without warning for year 2000 repairs, Keyworth said. When users called to report problems, help desk staffers had to say they didn't know the cause. A new plan requires at least two weeks' notice to system users, via the Web, before anyone shuts down the system.

"It lessens the number of unexpected outages to the 40,000 clients we have around the world and keeps them from calling unnecessarily," said Brett Grandjean, service desk program manager at Dow Chemical.

Companies should also consolidate year 2000-related information into one help desk, Keyworth said. For example, if a company is making changes to a lot of desktop configurations, information on each upgrade should be logged in to one database.

DHL Worldwide Express Inc. in Redwood Shores, Calif., recently tested and upgraded 5,500 help desk systems that run its online shipping business.

"To a certain degree we already had some information [gathered], but we've consolidated the rest of [the] appropriate information because of Y2K," said Mike Comstock, DHL's vice president for electronic commerce and planning. The centralized information will allow DHL to quickly track and fix glitches on its equipment.

AT A GLANCE

Help Desk Y2K Success

Requires:

COMMUNICATION with year 2000 project leaders

CONSOLIDATION of help desk to leverage resources and information

SOURCE: GARTNER GROUP INC.

Software Kit Can Bridge Noncompliant Systems

'Stopgap' measure is for smaller firms

BY JAIKUMAR VIJAYAR

The National Association of Manufacturing (NAM) has a ready-made software package to keep essential systems running if a manufacturer's systems fail because of year 2000 problems. NAM — with 14,000 direct members and more than 190,000 affiliated members — has teamed with a consulting firm and a vendor to offer Jump Start 2000: A Manufacturer's Survival Kit, a package for small and midsize firms.

Available for lease or purchase, the software kits — and hardware if needed — will help manufacturers who aren't year 2000-ready keep up essential functions such as financial and ordering services (see chart at right). The packages are standalones and would be used instead of current systems that aren't year 2000-compliant. Pricing for the packages starts at $55,800.

They're being offered by NAM in conjunction with McGladrey & Pullen LLP, a Cedar Rapids, Iowa-based consulting firm, and Fargo, N.D.-based Great Plains Software Inc., a provider of integrated financial and manufacturing software.

"The idea is to provide a bridge for companies that realize late in the game that they are not going to be able to convert their critical systems," said Thomas J. Orlowski, vice president of information systems at NAM in Washington.

There are caveats to the NAM plan: It will still take users at least three weeks to do the customization required even for basic functions; the plan is aimed only at shops with up to $200 million in revenue; and NAM and its partners are equipped to handle only about 500 jobs.

Savvy Needed

And will it really work? "Packages like these are stopgap arrangements whose success depends on the level of technical savvy a company has" to implement it, said Kazim Isfahani, an analyst at Giga Information Group Inc. in Boston.

Apart from the customization work required in the software itself, other tasks such as copying data from hard copy files — like master customer and vendor lists — also could take time, said Christopher Hopsecger, director of information systems at T&M Rubber Inc. in Muncie, Ind.

NAM's year 2000 efforts are similar to those by other industry groups, though Isfahani hasn't heard of a similar package offered in any industry.

CONFIGURATION	COST
General ledger, purchase and sales order	$55,800
All of the above, plus manufacturing order taking	$87,900
All of the above, plus manufacturing resource planning	$98,900
Same as above, but with support for more users	$124,900

SOURCE: NATIONAL ASSOCIATION OF MANUFACTURERS

For instance, The National Automotive Dealers Association in McLean, Va., with nearly 20,000 members, doesn't have a product. But it's offering a series of audio conference calls and year 2000 seminars to highlight the problem. "So far, we have seen the people dealing with the problem rising from 15% to well over 50% over the last few months," said Dick Malaise, director of IS at the group.

SNAPSHOT

Competitor Comparison

Here's what the nation's top two trucking companies are spending on the year 2000 problem:

	CNF TRANSPORTATION	YELLOW CORP.
1999 Fortune 500 rank	321	469
Costs through 1998	$22M	$13.7M
Estimate of total costs	$40M	$17M to $18M
Notes/Status	Renovation of all business-critical systems should be mostly completed by the end of June	Final verification testing slated to have begun by the end of March

SOURCE: COMPANIES' 10-K FILINGS MARCH 1999 WITH SECURITIES AND EXCHANGE COMMISSION



HOW FAR WILL YOU GO FOR A BROADER PERSPECTIVE OF SERVICE LEVEL MANAGEMENT?

You don't need to travel far to learn how to maximize your investment in Service Level Management for your enterprise. In fact, the 13th annual Boole & Babbage Users Group (BBUG '99) will be held right here on Earth—in Las Vegas.

From June 6th though the 10th, Boole & Babbage will hold this year's BBUG meeting at the new, exquisite Bellagio Hotel in Las Vegas.

Your attendance will provide insights into the next wave of Service Level Management. You'll influence future product development, interact with industry experts, receive certified training, and network with your peers.

Choose from over 100 sessions including:

- How to Write Service Level Agreements
- Achieving ROI from Service Level Management
- The 10 "Best Practices" of Enterprise Management
- Middleware and e-commerce Challenges and Trends
- Maximum Application Availability
- The Future of Service Level Management



Keynote speakers will include:

- Captain James Lovell, Commander of the Apollo 13 and its ill-fated mission to the moon
- Peter Levine; President and CEO of Decision Drivers, a GartnerGroup Company
- Michael Peterson; President, Strategic Research Corporation
- William J. Reedy, Vice President of Transaction Systems, Marketing, IBM Software Solutions Division
- Tom Rosamilia, Vice President of S/390 Software Development, IBM

Managing disparate systems and business-critical applications while meeting service level objectives is no trivial task. BBUG '99 can help.

So fly out to Las Vegas this summer and learn how you can help make your organization more competitive.

Register today at www.boole.com or call 800-374-7044

BMC® SOFTWARE

TECHNOLOGY SELLS WHEN YOU'RE TALKING TEENS

Advertisers find new media attract young buyers

BY THOMAS HOFFMAN

Advertisers are beginning to use Internet and other technologies to pitch products to the biggest consumer audience in America since Baby Boomers began coming of age in the 1960s.

But the trick to reaching the 60 million or so youths who make up Generation Y is more about making sure to market to them electronically in a nonintrusive way, say advertising experts. Otherwise, it's later for you, dude.



ADVERTISING CEO Chris Jones: Free phone calls appeal to teens

"The era of trying to sell 'whiter whites' is over," said Jamison R. Davis, creative director at Modem Media Poppe Tyson, an interactive marketing firm in Norwalk, Conn. Technology, he said, "will allow [advertisers] to create individual branding experiences at a fraction of the cost that it used to."

Generatioo Y, representing children ages 6 to 17, has $68.6 billion in spending power, according to Yankelovich Partners Inc., a Norwalk, Conn.-based consumer marketing firm.

To make Web sites more appealing to teens, Davis suggested creating a virtual reality tour (as his firm did for Hiram Walker) or generally make Web surfing "more of an interactive experience," he said.

Case in point: BroadPoint Communications Inc., a Landover, Md.-based firm that offers free long-distance telephone services to consumers who are willing to listen to five audio advertisements before calling.

The approach is "great for [attracting] teens, given [the] time they spend talking on the phone," says Chris Jones, chairman and CEO of J. Walter Thompson, an advertising firm in New York.

But it's difficult to gauge the success of that service because it's only a few months old. And analysts aren't so sure it will appeal to cash-strapped teens. "Kids want things instantly," said Frank Dzubeck, president of Communication Network Architects in Washington. Dzubeck said the advertising-for-phone service trade-off "might be more attractive" to other price-sensitive consumers such as retirees who have the patience to sit through an ad blitz.

But even if BroadPoint's service reaches a small percentage of teens, there could be significant upside potential for advertisers who use the service. Today's teens can watch TV, surf the Web, listeo to music, talk to friends on the pbone *and* do their homework all at once. It's a capability that futurist Bob Treadway refers to as "time-stacking," or the ability to multitask while absorbing multiple stimuli.

AT&T Corp. has successfully used TV to sell Internet services to Gen Y. Last December, the telecommunications firm reintroduced a television commercial pitching its WorldNet Internet services that features two moon-eyed teen-agers who fire off e-mails to each other after a date while Patsy Cline warbles in the background. The spot helped AT&T reach 250% of its Jaouary 1999 WorldNet sales target.



Orange County Takes Bids Online

System attracts more bidders, yet other states wary

BY PATRICK THIBODEAU

Orange County, Calif., has developed an online purchasing system that allows a business to bid for state contracts. The system has brought in many more bids than before, often with more competitive rates. By automating some of the process, the site ultimately reduces the county's administrative costs, county officials said.

Despite those benefits, few states are rushing into online bid systems.

Other state officials say ongoing concerns about digital signature standards and the inability of online bid systems to handle complex bids are two reasons they aren't following Orange County.

Orange County is working around both of those issues. The county isn't using digital signatures to authenticate users. Bidders who register receive a user name and password. And the bidding system is being used only for simple commodity purchases — such as printers or food — where the low bidder is usually the winner.

"It was just one of those elegantly simple projects that has done wonders for us," said Orange County CIO Leo Crawford. American Management Systems Inc. in Fairfax, Va., paid for approximately one-third of the $250,000 project because it wants to use Orange County as an example for other customers, he said.

Under the previous paper-based system, a county buyer would mail out between 10 and 30 invitations to bid. Invitations were limited to keep paperwork down.

Now, the county sets no limits and routinely receives 25 to 70 bids from some of the 2,000 vendors that have registered since January. Bids are taken online, and the system prepares a spreadsheet with the results for the buyer, Crawford said.



ORANGE COUNTY CIO Leo Crawford: Online bid system "has done wonders"

But Gary Lambert, Massachusetts state deputy purchasing agent at Operational Services Division in Boston, disagreed on whether a user name and password is eoough to ensure "a legally binding transaction."

Legal standards on digital signatures are also being worked out, said Bob Mayer, the CIO of the state of Maine in Augusta. His state is considerlng legislation addressing that issue.

MOREONLINE

For procurement resources, articles, publications and *Computerworld* coverage, visit our Web site.
www.computerworld.com/more

Lost the dongle.





RealPort™
The Integrated PC Card
Nothing to Break. Nothing to Lose.

It usually happens when you need your PC Card the most. But it'll never happen with the family of RealPort Integrated PC Cards. There's nothing to break. Nothing to lose.

After years of connecting with LAN and modem cables, we came up with a better way. We got rid of them.

Dongles are history. Connect with the times.

The revolutionary RealPort Integrated PC Card family offers the following features:

- Robust integrated connectors
- 10Mbps and 100Mbps Ethernet support
- 56Kbps modem speed—supporting V.90 and K56flex standards
- LAN+modem, LAN only and modem only cards
- GSM and AMPS cellular capabilities

Visit our Web site or call for information regarding Xircom's:

- ➤ Evaluation Unit Program
- ➤ Trade-In Promotion

www.xircom.com
or call toll free:
877-RealPort (877-732-5767)

Xircom

Get mobile. Stay connected. Go places

©1999 Xircom, Inc. Xircom is a registered trademark of Xircom, Inc. Xircom U.S. Headquarters: (805) 376 9300 Xircom in Canada: (905) 479 0230 Xircom in Latin America (727) 343 7040



SQL Server takes a big step toward enterprise capability and introduces dramatic ease-of-use improvements with version 7.0 of the database server." – *PC Week*[1]

"New features extend SQL Server's performance and scalability...most of the changes will move SQL Server from the role of department server **into the role of enterprise database server."** – *Windows NT*[2]

"SQL Server 7.0 boasts impressive features that administrators and users will both appreciate." – *InfoWorld*[3]

"SQL Server 7.0 provides the flexibility, relational power, and continued ease of use that should put the product in the corporate winner's circle." – *Intelligent Enterprise*[4]

"We recommend that you consider SQL Server 7.0 for new data warehousing projects ranging from departmental and Internet business

data warehousing even to the enterprise.

especially if you're running Windows NT also.

PC Week Best of Show, *COMDEX/Fall 1998*

Database and Server Software 1998 Product of the Year – *InfoWorld*



Microsoft
Where do you want to go today?®



It's great that critics think it's enterprise ready, but it's more important that we convince you. We invite you to find out more about Microsoft® SQL Server™ 7.0 at www.microsoft.com/sql

© 1999 Microsoft Corporation. All rights reserved. Microsoft and *Where do you want to go today?* and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Other products and company names mentioned herein may be the trademarks of their respective owners. [1]Reprinted from PC Week November 16, 1998. Copyright © 1998 ZD Inc. All Rights Reserved. [2]Windows NT [3]InfoWorld, 11/23/98 9/98 [4]DBMS Magazine, 6/98 [5]InfoWorld 2/15/99

FOR THE BOOKSHELF

New titles for serious, sensuous IT issues

BY ALAN R. EARLS

The Office Romance: Playing With Fire Without Getting Burned
By Dennis M. Powers
Amacom Books, New York, 1998; 316 pages, $22.95, hardcover

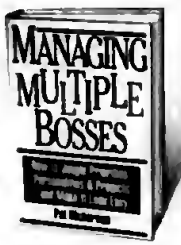


OK, OK, this isn't exactly an IT-heavy tome. But let's face it. Birds do it. Bees do it. Presidents do it, too. And with the often long hours and the intensity of interactions within work teams, IT workers also, presumably, do it. *The Office Romance* looks at this time-honored subject from every angle and provides answers and advice on how to avoid most of the pitfalls of this most human of human activities.

Fortunately, it's also well-written and fun. And, rather than preaching, author Dennis M. Powers acknowledges that the workplace is still our most vibrant social milieu — and one of the best places to find a mate. That's not an entirely new discovery, to be sure. What is new are the formal and informal constraints that have grown up, especially in the past decade, relating to potential or perceived sexual harassment. And of course, there's the perennial requirement that what's good for the individual had better not be bad for the work environment or employer.

The examples of successful office romancing Powers provides include many anecdotes from men and women in a wide range of workplaces. Like other good stories, they are entertaining and instructive. But he also includes a discussion of representative policies from a range of organizations, as well as a helpful summary of evolving legal and regulatory issues.

Managing Multiple Bosses: How to Juggle Priorities, Personalities & Projects — and Make It Look Easy
By Pat Nickerson
Amacom Books, New York, 1998; 155 pages, $15.95, softcover



More and more IT workers are suffering from schizophrenia — or something much like it. With diverse and complex tasks, multiple profit-and-cost centers and rapidly evolving organizational goals, it isn't at all that unusual for an individual to have "dotted line" connections with several managers. Each of these managers in turn has his or her own personality, priorities and workstyles. The pressure is on to serve these many masters, each with legitimate yet competing demands.

In this new environment, Pat Nickerson argues, it's necessary that professionals acquire new social, business and management skill sets. Call it managing managers from a position of limited authority. For example, it can be important to learn to say "no" to a boss when demands are unrealistic.

Professionals must learn to balance random tasks against major goals, manage stress and delegate tasks to others. That can be especially important in IT, where there's a long history of "throwing people at problems" rather than employing good planning right from the start. Nickerson provides about two dozen case studies, as well as recommended solutions, survey summaries and self-assessment tools to flesh out her points. Although clearly not for everyone, *Managing Multiple Bosses* is a good reality check for anyone feeling stretched by their organization's complex demands. ◗

Earls is a freelance writer in Franklin, Mass.

Sites for IT People Who Need People

Forums, user groups abound for IT pros seeking community on the Web

BY LESLIE GOFF

People who need people are the luckiest people, goes the song by Barbra Streisand. The Web ostensibly offers information technology folks plenty of places to find the people they need, but many sites have their share of drawbacks.

Newsgroups are frequently flooded by spam and otherwise irritating postings by people who have no business congregating there. User group sites are too localized and/or lack interactivity.

The following is a selection of IT sites that break through the common barriers. They convey a sense of community, offer a haven for your rants and raves, fortify the profession and otherwise make you feel like a member of an elite club. They're like "buttah," in Barbra's words.

Community Sites

■ **Developer.com**
www.developer.com

There may not be another site that offers a greater sense of IT community than this one. It's like Main Street, U.S.A., for application developers. The site comes complete with a row of mom-and-pop shops for technical advice; free downloads of graphics, code and software; tutorials; training and certification information; job listings and career advice; news; a calendar of industry events and seminars; and more. Then there's the corner where you can linger for a while, swapping stories and getting homespun remedies for whatever ails you. But this Main Street extends beyond the American landscape: It's available in Spanish, French, German and Japanese, too, making it a truly global village.

The discussion groups here are vertical and well-organized. They're divided into large topics, like enterprise computing, databases, and programming and scripting, which in turn are subdivided into niches like data warehousing and enterprise resource planning (ERP), DB2 and Oracle, and Java and C/C++. In the left-hand frame, check out the sound bites for top discussions of the day. Each local discussion is moderated by an industry expert, and the site also links to relevant Usenet newsgroups.



DEVELOPER.COM offers the IT professional technical advice, discussion groups and more

■ **Java Lobby**
www.javalobby.org

The open nature of Java and the free-wheeling attitude of Java aficionados have spurred countless numbers of Java-related sites, several of which have been reviewed here before. The Java Lobby aims to "endorse the concept of 'write once, run anywhere' " code. It also tries to secure Java's future as a "truly portable, reliable, open, standard, bug-free and high-performance" language. For that, as well as its reliance on and contributions to its membership, javalobby.org merits recognition as a community site.

Volunteer to help create a pure Java application in the JavaLobby Foundation Applications group (a few completed applications are available for downloading, as is a collection of Java icons); vote in weekly polls on topics of concern to Java devotees, like the new Sun Community Source License; and post news stories, along with your opinions of them, that are relevant to the JavaLobby mission. You can also add your reply to each member's selections. Naturally, a fair amount of Microsoft bashing goes on here. Finally, use the left-hand frame to link to more than 85 sites for up-to-the-minute Java news, downloads, ports, compilers, tools, directories, frequently asked questions and other ready-made resources. Registration is required.

The Fan Clubs Sites:

■ The ERP Fan Club
www.erpfans.com

■ The PeopleSoft Fan Club
www.peoplesoftfans.com

■ The SAP Fan Club
www.sapfans.com

■ The Baan Fan Club
www.baanfans.com

■ The Oracle Fan Club
www.oraclefans.com

■ The Windows NT Fan Club
www.windowsntfans.com ◗

Goff is a freelance writer in New York. She can be reached at lgoff@ix.netcom.com.

MOREONLINE

For links to other Web sites with discussion areas, chat rooms and message boards of interest to IT professionals, visit our Web site
www.computerworld.com/more

THE

SAP

INSIGHT:

Your departments should speak to each other.

THE

D&B

INSIGHT:

It would be nice if they spoke the same language.

INTRODUCING D&B FOR SAP SOLUTIONS. TOTAL INTEGRATION MEETS TOTAL INFORMATION.

SAP AG and Dun & Bradstreet have developed an integrated enterprise application solution to help you maximize business opportunities across your entire supply demand chain.

Now, companies will receive a truly standardized business solution, seamlessly integrated with reliable on-line business content. Through D&B's Data Rationalization Service, and the use of our unique D&B D-U-N-S® Number, legacy files of both customer and vendor data can now be cleansed, updated, organized and supplemented with demographic, risk and purchasing information, collected on more than 50 million businesses worldwide. This D&B information base is updated 950,000 times daily—all accessible directly from within the SAP R/3® solution.

So whatever your stage of implementation, call 1-800-756-5762 to learn more about how D&B can help enhance your SAP solution, or visit our Web site at **www.dnb.com/sap/.**

D&B
Dun & Bradstreet

SAP and R/3 are trademarks of SAP AG. Dun & Bradstreet, D-U-N-S and D&B are registered trademarks of Dun & Bradstreet.

BRIEFS

Handheld Risks, Benefits Cited

Personal digital assistants (PDA) may pose security risks, but the handhelds' ability to increase business performance outweighs those risks, according to a study by AMR Research Inc. in Boston.

But less than half of the 55 multinational companies responding to the study have established security policies to protect PDAs from unauthorized use, and only 37% require a password to access data. Just more than half believe information technology has a role in supporting and managing the devices.

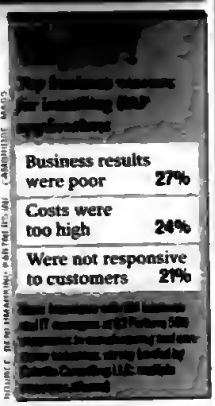
Outsourcing Gains Backers

Three out of four top U.S. companies now outsource one or more business processes to external service providers, according to a study by Yankelovich Partners Inc. in Norwalk, Conn. Management functions are most frequently outsourced, at 51%, followed by payroll at 49%. The study surveyed 100 U.S. companies with an average of $4.4 billion in revenue.

First Union Hires Wang, Again

Wang Global in Billerica, Mass., will handle all planning, implementation and support of desktops and networks at Charlotte, N.C.-based First Union Corp. under a new 10-year, $220 million outsourcing agreement announced last week. Wang already provides the $237 billion banking giant with help desk support and hardware maintenance services.

The new contract calls for Wang to furnish all network and desktop services, from planning through implementation, plus ongoing support and upgrades.



Port Authority Adds SAP

Plaut Consulting Inc. in Waltham, Mass., said it completed implementing a SAP AG R/3 enterprise software system for the Port Authority of New York and New Jersey in 11 months.

The system comprises financial accounting, materials management and project systems applications. It supports 1,200 users and replaces more than 20 legacy systems and dozens of standalone applications.

Contract Signed

Ebsco Information Services, a Birmingham, Ala.-based subscription management company, has signed a multimillion-dollar IT services contract with IMRglobal in Clearwater, Fla., according to IMRglobal. Among other things, IMRglobal will migrate Ebsco's legacy data files to relational databases. The companies didn't disclose the value of the contract.

CIO Moves On

Dick Smith, former senior vice president and CIO at Carlson Wagonlit Travel in Minneapolis, has joined Luxury Travel Co. in Atlanta as its CIO. Prior to joining Carlson in 1996, Smith, 50, was CIO at Holiday Inn Worldwide from 1990 to 1996.

PETER G. W. KEEN

Middle-out ideas

OF ALL THE MANY revolutions under way in IT, the revolution in leadership may be the most critical of all. Today, business innovation through IT requires middle-driven leadership, not top-down leadership as in the past. The middle is where the real strategists and visionaries must be found. In the 1980s, IT innovation largely had to come top-down, because the agenda for effective action required that top management provide direction and policies for using IT.

That dialogue — nr lack thereof — between CIOs and senior managemeot determined the winners in the electronic marketplace. American Airlines, British Airways, Citibank, Federal Express, USAA — tbe historical IT hall nf fame — is full of senior manager quarterbacks. Soon that ball nf fame will be packed with centers, tackles, free safeties aod wide receivers. This new reality is apparent in the relative successes and failures in electronic commerce, supply-chain management and customer service.

Electronic commerce began in the 1980s in the middle level of the procurement department, with electronic data ioterchange (EDI). Despite EDI's benefits, it was difficult to explnit because it was an organizational orphan in the old tnp-down era of IT innovation. It wasn't part of IT and certainly wasn't something CEOs dreamed about at night.

Enter Web commerce. With cautious CEOs giving it the green light, the middle of the business is now the key.

Consider what makes Web commerce successful. It's not a neat site but a new level of coordination aod cross-fuoctional knowledge and collaboratinn. A Jan. 11 article in *The New York Times* titled "Online customer service? Patbetic" gave story after stnry about problems: wrong goods being delivered, customers unable to get answers to tbeir questions or being told that the presents they nrdered were out of stock, and maoy others.

It makes sense for process-savvy business-people to lead e-commerce



Forget about the "new paradigm" stuff, or the nonsense about throwing out the old business model. As you build your oew model, draw on tbe elements of the old that will make it work.

Amazon.cnm's ultra-new business model boasted of no physical inventory but a virtual warehouse nf 2.5 million books. But now, Amazon is building and running buge warehouses.

More than half of Charles Schwab's revenue comes from ooline trading, but tbe success of the brokerage's new model rests on the priociples of the old model — personal contact, easy handling of accouot detail, reliable processing aod the use of branch offices (30% of its customers have visited one in the past six mooths because they like to see the people to wbam they're giving their money).

Commerce is commerce. Knowledge managemeot and intellectual capital reside as mucb in those people who understand today's customer relationships, business processes and supply chain as those who are part of the virtual future.

Business is a process game, and it's the people io the middle of the business who understand process. Web sites witbout process smarts will fail. It makes sense for the process-savvy businesspeople to lead electronic commerce while traditional IT people enable and support it.

As executives absorb these lessons, oew IT functions will evolve. One will report to the chief customer service officer and be half composed of customer-service experts. Aoother will report to tbe new chief supply chain nfficer and be half composed of logistics pros. General Motors recently bired Fruit of the Loom's CIO and gave him the title of "customer experience process informatioo officer."

IT professionals must adapt to a cootext wbere collaboration is the currency of inoovation and diversity its enabler. They will have more noo-technical bosses and colleagues and be asked to learn more about business processes. This new style of IT — led from the middle — will establisb sustainable competitive advantage.

Keen is co-editor of a newsletter called "YOU2K Now." For more information, visit his Web site at www.you2k.com. His Internet address is peter@peterkeen.com.



Picking Your People Strategy

The IT labor shortage has spawned hundreds of suggestions for retaining and recruiting technologists. Which are right for your organization? In their new book, Coping with Labor Scarcity in Information Technology *(Pinnaflex Educational Resources Inc., Cincinnati; www.pinnaflex.com/apc), co-authors Thomas Ferratt and Ritu Agarwal suggest that information technology executives match tactics to one of four specific human resources strategies. The book is based on research for the Society for Information Management's Advanced Practices Council. Allan E. Alter,* Computerworld's *department editor, managing, prepared this interview with* **Thomas Ferratt,** *an IT professor and associate dean at the University of Dayton (ferratt@udayton.edu) in Dayton, Ohio.*

How do you approach recruitment and retention so you have a real strategy – not just a collection of tactical Band-Aids? Companies need to think about how long they want to keep people and what needs they're trying to satisfy in the people they recruit. With that, you can develop different IT human resources strategies. We've identified four: "long-term investment," "balanced professional," "high-performance professional" and "short-term producer" (see box).

Which strategy do you see most often? The balanced professional and long-term investment. They're less stressful to manage.

Why is that? In the high-performance professional model, the emphasis is on productivity and achievement. There are no counterbalancing practices to relieve stress.

How might pay practices differ with each? With a short-term professional strategy, you'll have to pay at the top of the market. If you are pursuing a long-term investment strategy, there are other inducements besides pay such as accumulating retirement money and vacation time — though you still need to be at some minimally competitive market level.



"It makes sense to have a dominant [IT human resources] strategy and then have varying practices that you can explain well."

THOMAS FERRATT, CO-AUTHOR, *COPING WITH LABOR SCARCITY IN INFORMATION TECHNOLOGY*

How do you pick the right strategy for you? Look at your company history, including the role that IT plays and the human resources strategy of the larger organization. It creates difficulties if you go counter to it.

We learned of one company that was using a high-performance professional strategy, and the overall company had a long-term investment strategy. The HR manager in IT walked into a buzzsaw. IT wanted a more casual dress code and salaries that were more incentive-based. Both of these were contrary to corporate practices.

Why do companies choose a short-term or high-performance strategy? We didn't run into anyone with a dominant short-term professional strategy. Companies use the high-performance professional strategy because they are looking for new ideas and see new people as a way to do that. And they have less need for company-specific skills.

How might a retention tactic succeed in one kind of company and fail in another? Here's an example: Using a performance-measurement system to identify developmental needs can succeed in a company offering training and development. But in a company which doesn't provide good training, identifying development needs would only frustrate people.

You argue that a long-term investment or balanced-professional approach is probably the best. Why? Many IT professionals are motivated by money or technical challenges. IT professionals find companies following these strategies are less stressful places to work — that's why they're the most common. That's not to say the high-performance professional strategy can't be implemented successfully, but it will take more work. Dealing with stress is the challenging task.

Couldn't you have one strategy for programmers and another for other kinds of IT professionals? It's very difficult to get a common understanding of your IT human resources practices across an IT organization. So it makes sense to have a dominant strategy and then have varying practices that you can explain well.

For example, one company was following a long-term investment strategy. But when the Y2K problem came along, they said assembly language programmers were the most important need, so they would be the highest-paid group at that time.

Being able to explain is important, because the other barrier we found to implementing an IT human resources strategy, besides stress, was a sense of inequity. In one company, an IT professional said, "We are working our tail off here, and then we look at the bonuses management is getting, and it just deflates us."

Are there tactics that work no matter what strategy you pursue? IT professionals need and want feedback. And some minimal, market-based compensation level is needed. Many managers told us you can't communicate enough with your people. But our sense is you have to be selective. People are likely to tune you out if you overwhelm them with information. ◗

You can contact Alter at allan_alter@computerworld.com.

4 Human Resources Strategies:

Long-term investment: For companies that seek a stable, loyal IT workforce rich in company-specific knowledge. Long-term career development, job security, work/family balance – but not high pay – are the main staff motivators.

Balanced professional: For keeping achievement-oriented workers who need balance and flexibility in their lives without making lifetime commitments. Managers must provide opportunities for personal development and expect moderate turnover.

High-performance professional: High energy, achievement and pay make this kind of company attractive to IT's best and brightest. A viable strategy for companies at the cutting edge, but managers must expect high staff stress and turnover rates.

Short-term producer: For companies that want maximum productivity, minimal personnel commitments and are willing to pay the price in unusually high salaries and turnover. Comes closest to the contractor model.

Flying Solo In Consulting

Want to get your own consulting business off the drawing board and on the ground? Consider the advice of three IT pros who have done it By Leslie Goff



Right Place at the Right Time

If he were to start his consulting business now, Eric Berkowitz says he might hesitate before taking the plunge.

The opportunities are better these days, and the perception others have of information technology consultants has improved since Berkowitz launched his consulting career in 1994. But his personal situation has changed in ways that would have a bearing on his decision to leave the security of the corporate fold for independent IT consulting.

Berkowitz arrived at consulting through a series of small steps, cashing in on a much-needed specialty. As a full-time employee at Hasbro Inc., Berkowitz had developed some PowerBuilder skills. When he saw consultants on his projects making more money and getting the plum assignments, he decided to try it himself.

To test the waters and get acclimated to the consulting pace, Berkowitz signed up as a W-2 salaried employee with a small consulting firm that offered custom software services. After a few months — and a gig at NEC Technologies in his portfolio — he left the company and freelanced as an hourly W-2 through The Registry, an agency in New England. He secured an assignment at Fleet Bank, accrued more PowerBuilder experience and went for his certification. When he was on the verge of landing his first direct assignment, he incorporated as a sole proprietor to seal the deal.

PowerBuilder has given him a good life for five years, Berkowitz says, and he has taken the time and expense to keep his skills up-to-date. He signs up for classes as new releases are rolled out. Now he says he's looking for the next big thing and is eyeing opportunities to transition into electronic commerce.

"When I started out, I read in a book on consulting that if you can do what you love for five years and get paid for it, you are a success," Berkowitz says. "I've done that. But now the [PowerBuilder] rates are coming down. People tend to get defensive about their skill sets, but you have to recognize that things change and that you need to add the hot skills to your portfolio. The challenge is in doing that while remaining a consultant and maintaining your current rates."

Were he to consider starting a consulting career today, Berkowitz says it wouldn't be as easy. In those five years, he got married and bought a house. And he and his wife are starting to plan their family.

"At the time I did it, I was in a good situation where there wasn't a lot of personal risk," Berkowitz says. "If I had failed, I could have afforded it. I was single, and I was living inexpensively. Now when I think about things, I have a different perspective. I might place a different value on financial and geographic stability."

Best of a Bad Situation

Sometimes, IT professionals find themselves thrown into consulting by the fates.

Thomas Bolz Jr. had toyed with the idea of consulting but was afraid to step out on his own. Then his employer, an apparel manufacturer in Bowling Green, Ky., gave him the push he needed: Bolz was downsized.

He had a severance package and enough money in the bank to support himself and his wife for six months. When he started looking for jobs that would leverage his specialty — Retek Demand Forecasting software, a vertical package for clothing manufacturers — he found all the jobs were out of state. He wanted to stay in Bowling Green. So in an interview at Kenosha, Wis.-based Jockey International Inc., he proposed that he take the job not as a salaried employee but as an independent contractor paid as a 1099.

"This was the third time I had been in a layoff situation, so I was already past the idea of counting on a company to provide security," Bolz says. The word permanent doesn't mean a whole lot these days."

Since then, Bolz has traded on word-of-mouth and his hard-to-find expertise and now is working at Retek Retail Solutions in Minneapolis. He says the most difficult aspects of being a 1099 are the business details: the quarterly taxes and high self-employment tax; keeping a diary of mileage, phone calls and other expenses; tracking his hours; and getting accustomed to not having a regular, biweekly paycheck. He maintains a six-month cache of savings for unanticipated downtime and tries to forecast his next move.

"Always keep feelers out for future opportunities. Don't be too content with a contract because you never know how long it will last," he says. "I had one that was slated for six months, and it ended up being six weeks because the company changed direction."

Reaping What You Sow

Striking out as an independent consultant can be an immediate way to take home a larger percentage of what you're earning.

That was the motivation for Robert Gomez, now a principal at Cornerstone Information Technologies LLC in Dallas. Gomez had worked as a W-2 salaried consultant for four years. In 1997 he began working as an independent 1099. But as a 1099 he still had to work through agencies as a subcontractor and would hit brick walls when he tried to get direct assignments. That's when he decided to partner with an old friend, Louis Freitas. Last August, the two founded Cornerstone.

"We wanted to build something larger, something for consultants that was similar to, but better than, the companies we had worked for as W-2s," Gomez says. "We tried to take all the good points and do away with all the bad points."

Forming Cornerstone demanded a lot more planning than starting as a 1099, Gomez says. He and Freitas had to secure capital to fund a payroll, secure liability and error insurance, nail down the company's focus and hire staff. Then there was the minor detail of losing up the initial clients. Gomez and Freitas turned to previous clients not just for work, but also for their initial capital. They presented their business plan and explained the services they could offer in exchange for seed money.

Even with their advance planning, Gomez says they ran into two critical stumbling blocks: They failed to anticipate that they would need marketing support, and they underestimated the amount of time it takes to transact contracts with clients. He notes that it can take as long as seven months to finalize a deal.

"You can't focus on your core competencies if you're managing all the business stuff," he says. "You can't depend too much on your own efforts to find clients and resources. You go into consulting because you want to keep more of the money, and to do that, you have to let it loose."

Goff is a freelance writer in New York. She can be reached at lgoff@ix.netcom.com.

DRIVING THE DEAL/JOE AUER

Going cheap? Look before you leap!

WHEN YOU GO SHOPPING for technology, do you use the initial price quote to decide which vendors make your short list? If you do, you're making a critical error. That's because looking at price alone limits choices too early in the process. You might eliminate the best all-around supplier from further consideration.

Here's why: The supplier that quotes the highest initial price may be the only one who fully understands your requirements. Often, a product with a higher initial price has a lower total life-cycle cost than others because of higher reliability, residual value or other downstream factors. The supplier that quotes the lowest price may be lowballing. Only further evaluation can sort it out.

Suppliers responding to your request for proposals won't include their best pricing in their proposal. They'll bid the highest price they think will get the deal under the competitive pressures they perceive.

Actually, suppliers won't give you their best price in any bid process — only during the negotiation process do they relinquish best pricing.

So don't rely on your bid process alone. Supplement it by negotiating aggressively with the highest level of authority at the supplier's organization responsible for the deal. Don't give up until you've heard several "no's," and never accept "no" from someone who doesn't have the authority to say "yes."

Price is usually the most negotiable element in any deal. Don't get into serious price negotiations until after you've determined which supplier(s) can deliver the product or service to meet your requirements, and be sure the vendor has demonstrated confidence in its own ability to perform. Most of the time, that requires significant contractual negotiations before you even get to negotiating the final price.

Remember: Getting the best price isn't everything. Getting full value for what you pay for means getting a product or service that performs as promised within the defined architecture — and getting it on time. Getting the best price is an important consideration in getting the best value.

A Win-Win Tactical Alliance

You want guaranteed flexibility and prices from your IT providers, without guaranteeing you'll buy anything at all. That may sound like too much to ask. But in recent weeks, business units at two companies were able to lock in such a deal. How? By giving those vendors a chance to reach new customers.

Here's how those deals went down: The buyers in the deals were large, decentralized IT organizations in decentralized companies (one health care and one consumer goods). Each wanted cafeteria-style deals for desktop services so their business units could freely pick and choose from a buffet table of services. They also wanted to lock in prices by setting price ceilings and establishing a per-unit-of-service pricing structure.



Joe Auer is president of International Computer Negotiations Inc. (www.dobettordeals.com), a Winter Park, Fla., consultancy that educates users on high-tech procurement. ICN sponsors CAUCUS, The Association of High-Tech Acquisition Professionals. Contact him at joe@dobetterdeals.com.

That wasn't all the buyers wanted. They didn't want to commit to any actual volume of business up front. All they wanted was an arrangement so they could buy in the future. Finally, both wanted the deals to be documented via a signed master contract.

Negotiations deadlocked for a while. Then a way to do the deal emerged: Both customers promised to help the suppliers sell their wares throughout the organization. That solution allowed the supplier access to potential customers. In return, the customers got access to a supplier that could perform, offered favorable pricing and was already signed up to a master contract — which made the acquisition easier and safer.

One of the deals has been struck; the other is pending. On the deal that closed, the supplier and the buyer — acting more like an internal advocate for the supplier — formed an alliance to sell the value of the supplier to the business units. The arrangement can be called a success because several business units have begun acquiring the supplier's services.

That type of arrangement works best when a vendor offers many services, and the customer can leverage the entire organization's purchasing power. It can be a way to gain access to quality service and performance and favorable pricing.

It also goes a long way toward letting the supplier and customer share in the risks and rewards of a deal. What a concept! ◗

WORKSTYLES

What It's Like to Work at . . . Entergy Services

BY LESLIE GOFF

Source: Boris Bosch, manager of database administrator services and support.

Company: Entergy Services, the information technology arm of Entergy Corp., a large utility.

Headquarters: New Orleans.

IT employees: 1,000 (19 in his group).

Employees (end users): 15,000 in four states.

Dress code: Business casual.

Any renegades? Yes. One guy looks like Jesus, with long hair, a long beard, jeans and T-shirt. He's one of my top people. He can get away with murder – I'll take his knowledge over his looks.

Workday: We have flextime, so we're off every other Friday. Normal business hours are 7:30 a.m. to 5:30 p.m.

Must people carry beepers? Yes.

Percentage of staff that telecommutes: Each person works from home maybe one day per month. But they have [Integrated Services Digital Network] lines so that when there's a problem after hours, they can log in.

On-site day care? No.

Where's the best place to eat? Our building is attached to a really large mall, and it has two levels of food courts. Then there are a lot of incredible little hole-in-the-wall restaurants nearby.

Free refreshments: None. We gave up on free coffee because people are very particular about coffee here in New Orleans, and you can walk to four or five designer coffee shops in the mall.

The one thing everyone complains about: We've been going through an outsourcing exercise here for the past six months, and that has had some people's attention. . . . I [also] hear a lot of complaints that my people are loud, and they are. They have their headsets on and can't hear themselves. I hear complaints that they talk too much, but they should, because they're tech-support people.

Is there an office candy dish? My secretary usually has candy on her desk. We also have a King Cakes tradition. They're these flat, oval cakes that are hollow with a little baby doll inside. Someone brings one in, and whoever gets the piece with the little baby inside has to bring in the next one.

What do you see on people's desks? One person has a U.S. map, and he has pins stuck in all the places he has been to. Another has a really nice U.S. map that shows the reflection of the light at night.

Vending machines: Each floor has a soda machine.

Cost per soda: 55 cents.

Where the office gossips: My senior folks are in the corner cubicles with the windows. So when I go pollinate, it seems four to six people will gravitate toward one of these cubicles to chitchat.

Little perks: I give out "Shining Through" awards for to recognize [efforts] beyond the call of duty. At the lower levels, people get something like golf shirts with the Entergy logo or an umbrella or a collapsible chair for outdoor events. At the higher levels, you can win something like a CD player or an AM/FM radio.

Last companywide/department perk: In two weeks, we will have a huge crawfish boil. Four departments are getting together, so we'll have about 200 people. We go to a park and have crawfish, jambalaya, boiled shrimp, beer and soft drinks. They've organizing games like "Dunk the Manager."

Would employees feel comfortable e-mailing the CEO? I don't know; [he's] a new CEO. He receives letters from employees and is open to communication. My employees are more interested in hitting [up] the CIO than the CEO.

Quote: "This is a great place. My people are second-to-none in this region. The technology here is awesome. The sad thing is that when you put an outsourcing in place [the effort began six months ago and could result in up to 100% of IT being outsourced], people tend to think about the bad things. A lot of really good people have jumped ship. There is uncertainty, high anxiety, and you can feel it in the air. So, eight months ago, I would have said there's nothing wrong here. Now, you can see the stress."

You've Put a Lot of Time, Money, and Data into Your Enterprise System.



SAS® Solutions Assure You Don't Blow It.

You're ready to start reaping a return on your ERP investment. You're set to turn your operational data into information that supports strategic decision making. But first you need to get to the data...and your data deposits are still locked away.

SAS intelligent warehousing solutions—from the world's leader in data warehousing and decision support—let you gain immediate access to SAP AG's R/3, or any other data, right now. What's more you'll have the capabilities you need to transform raw data into real business intelligence—and true competitive advantage.

Our solutions leverage strategic partnerships and are Year 2000 compliant, fully Web enabled, and platform independent.

- **Access, consolidate, and integrate corporate data whatever its source—R/3, other ERP systems, or other data sources**
- **Arrive at profitable decisions using data mining**
- **Build competitive advantage through customer relationship management, balanced scorecard, and more**

Visit us at **www.sas.com/erpdividends** for more information and to request our **free guide:** *Maximizing Return on Your SAP AG R/3 Investment.* Or give us a call at 919-677-8200.

The Business of Better Decision Making.

SAS Institute Inc.

In Canada phone 1 800.363.8097. SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies. Copyright © 1999 by SAS Institute Inc. 20692.IT

Tomorrow's IT

Business-savvy technologists, partnerships with end-user departments and the virtual corporation are among the things to come for IT, according to a *Computerworld* survey of 26 CIOs

LOOK CAREFULLY and you can see the IT organization of the future taking shape. Its pieces are in their infancy at some advanced companies, but they're swirling in CIOs' brains everywhere. Those CIOs must get a sense of where their information technology groups should be in a few years and must map the right route. Don't worry — it's only a bet-your-career type of process.

Computerworld set out to explore what the IT organization may look like in the early 21st century and to identify some things you can do today to prepare for that new order. We commissioned Market Data Group LLC, a Framingham, Mass., research firm, to interview 26 CIOs about the challenges and changes they expect to see in the next three to five years. Expect to see an IT organization based on partnerships, ceding more responsibility for IT work to end-user departments but continuing to maintain a centrally managed technology infrastructure. Also expect project management to become a more important skill for IT managers.

Here's a snapshot of what we found:



The Organization

Look for shifts to greater end-user responsibility for IT work, centralized management of the infrastructure and IT leaders like Chase Manhattan's Steven L. Sheinheit working more closely with business unit chiefs. Those are among the 10 organizational trends to watch. 62



The People

Technologists better be business-savvy, say CIOs such as Cardinal Health's Kathy Brittain White. They say they're recruiting from consulting firms to find people who enjoy a variety of challenges and that IT will more often play the role of systems integrator. 68



The Technology

Technologies that concern CIOs, such as Cummins Engine's Richard Diesk, include the network infrastructure to build the virtual corporation and to support mobile workforces, middleware and collaboration tools for e-commerce and object-oriented development tools for component reuse. 68

The IT department you know today is continuing to evolve into a more user- and business-focused function. Here are 10 ways IT will change in the next five years

By Rick Saia

1 End-user departments will take more responsibility for IT work. David Foote foresees the demise of the information technology organization as we know it. The former Meta Group Inc. analyst, now a principal at Cromwell Foote Partners LLC in Stamford, Conn., says he sees a "whole clouding of what an IT worker is." IT functions — and even management — will become part of business units and other departments.

Many of the 26 IT leaders interviewed for this special report agree. "IT will no longer be a separate entity" in the organization, says Marvin W. Adams, chief information and technology officer at Bank One Corp. in Chicago. "There will be a deeper integration of IT into the mainstream business as opposed to it being a service function."

Some organizations — including The Chase Manhattan Corp. in New York — are already integrating IT functions and management. IT at Chase is governed by a "virtual CIO" called the Technology Governance Board, a group of business-unit CIOs and key technology and business managers. The board deals with all enterprisewide technology issues while bringing IT closer to each line of business. Each CIO reports directly to the head of his business unit.

"I think this model works, and I don't see us organized in a materially different way down the road," says Steven L. Sheinheit, Chase's executive vice president for systems and architecture. "CIOs will play an increasingly important role ... as they work closer and closer with the business managers."

And Foote says he sees more such integration of IT and business units below the executive level during the next five years. For example, he says, more companies will pull line managers into big technology projects such as enterprise resource planning, working side by side with full-time technical specialists for months at a time to ensure that end users get what they need to do their jobs.

2 But the technology itself will be centrally managed. While Chase's business-unit executives call more of their own IT shots, the technology board provides overall guidance on IT. That covers standards, technology direction and even IT buying advice for the business units, Sheinheit says. And Chase still centrally manages its data centers, networks and midrange systems.

The IT shop "will need to be managed by an IT professional," adds Francis Dramis, executive vice president and CIO at BellSouth Corp. in Atlanta. Although the business units will direct the IT resources, or the "what" of technology, the IT organization will focus on the "how," or providing the technological means for what the company wants to accomplish, he says.

Dramis says for an IT organization to succeed, it will have to "look and act like a large consulting organization," providing advice to a client much like a lawyer. It will be "more like a guild than a delivery essence," guided strongly by its own professional standards, he says.

3 Business executives will force IT management to pay even greater attention to the value IT brings to the business. "The IT organization hasn't typically been good about relating [its] value in business terms to businesspeople," says Carl Wilson, CIO at hotel chain Marriott International Inc. in Washington. IT organizations, he adds, must "continually work [at showing] how IT can add value."

Little wonder then that Gartner Group Inc. drew about 700 attendees last month to New Orleans for a

Tomorrow's IT: The Organ



CHASE'S STEVEN L. SHEINHEIT: Bigger role ahead for CIOs

conference on justifying IT investments. Gartner, as well as Meta Group Inc., another IT research firm, believes IT organizations will have to more clearly demonstrate — in both quantitative and qualitative ways — how their investments impact both the organization and their companies' customers.

As IT spending has risen, the "intense spotlight" on year 2000, euro projects and the specter of litigation have given corporations good reason to take IT decisions away from the IT organization, Gartner Vice President Bill Kirwin said at the conference. CIOs need to do a better job identifying and realizing IT's benefits, including nonquantifiable benefits such as improving processes, facilitating team-based work and more quickly exploiting opportunities.

4 IT organizations will combat a continuing skills gap with more outsourcing. The outsourcing of IT functions among companies is rising and will continue to do so, say analysts and IT executives surveyed for this report. Gartner predicts that by 2003, three of every five large companies will farm out more than half of their IT activities. Business and IT management skills will make up 65% of the internal IT skills portfolio, while most technology-intensive skills will be bought from outside the company.

IT managers indicate that their in-house staffs will place more emphasis on user needs and business processes, and anything that the company regards as not being a core competency is likely to be farmed out.

At Menasha Corp. in Neenah, Wis., the IT organization is "not going to try to be all things to all people," says Dennis Biederman, CIO at the $1 billion paper products maker. Therefore, he won't hesitate to look outside his staff for help on projects, including a recent SAP implementation.

"We try not to say 'no' to good projects [that would] say 'no' to our customers," he says.

5 The demand for new systems draws attention to project management. After the year 2000 problem fades away, organizations will begin to dig into a pent-up demand for new systems to enhance competition, says Gopal Kapur (*gkapur@center4pm.com*), president of the Center for Project Management in San Ramon, Calif. But their big concern, he adds, is they don't have enough skilled project managers.

Wilson sees that as a critical area during the next few years. "The one most sought-after skill set is project management: People who know how to get things

The Organization, page 64

izatio n

Whether outsourced or insourced, every dollar has to be looked at in terms of the value it will produce.

STEVER L. SREIRHEIT, EXECUTIVE VICE PRESIDENT, CORPORATE SYSTEMS ARD ARCRITECTRRE, THE CRASE MARHATTAR CORP.

It will be incumbent for companies to create a renewable technology organization, meaning an organization that uses change as a way of constantly improving itself.

FRARCIS ORAMIS, EXECUTIVE VICE PRESIDERT ARD CIO, BELLSOUTH CORP.

Exploiting information for competitive advantage will help justify the money that companies must pump into information technology.

OERRIS RIERERMAR, CIO, MENASRA CORP.

Be willing to change and make change a core competency throughout the organization — from an individual through the work team to the total organization.

JODIE RAY, SERIOR VICE PRESIDERT ARD CIO, RRIRKER IRTERRATIORAL

Tomorrow's IT: The Organization

Continued from page 63

done through others when they don't have direct authority and know how to create harmonious relationships are the critical people to find and keep," he says.

But to develop project managers, Kapur says, organizations must develop a project culture and elevate the status of the project manager. Last year, Kapur conducted a seminar for senior project managers, listing for them seven questions they should ask a project sponsor to determine whether a project should go forward. Many felt they couldn't ask those questions at risk of angering the sponsor or an executive.

To keep projects running smoothly, Foote predicts more companies will create the role of enterprise project manager — a person who makes sure all projects have the resources they need and understands how projects affect one another. Besides strong people and technical skills, they'll need knowledge of the business' goals and the ability to persuade managers to share their best people with other projects, he says.

6 The CIO undergoes a status upgrade. A study conducted last year found more CIOs becoming part of their companies' senior management teams. The study, by the executive search firm Korn/Ferry International and *Financial Times* newspaper [and published there July 1, 1998], found the following:

- The CIO's role is moving from technical planning and implementation to strategic planning.
- The ideal qualifications for the CIO are changing. The "ideal résumé" of a CIO will come to include both technical/engineering qualifications and a background in finance, marketing and strategic planning.
- The CIO will become increasingly involved with external as well as internal customer support.

As information continues to drive much of the economy, CIOs could also start to become "chief innovation officers." Peter Burris, senior vice president and co-research director at Meta Group, says the IT organization must facilitate innovation in the business and must also demonstrate the value of each IT investment to senior executives.

Burris says he sees more CIOs coming from outside the technical arena, helping to better integrate IT with the rest of the business. The Korn/Ferry study found that 36% of the 150 U.S.-based CIOs in the survey came from outside IT, and, according to Mark Polansky, managing director of the IT practice at Korn/Ferry, that's more than in previous years. But 79% of the U.S. CIOs found general business to be at least "somewhat important" in order to succeed.

7 The rise of relationship management. Dramis says relationship management, or the ability of IT professionals to relate to people in the business units, is missing today but will be critical tomorrow. IT managers must be able to understand users' business problems and articulate the technology options that can fix the problem.

A November report by Gartner, entitled "The Five Pillars of IS Organizational Effectiveness," highlights the reason for that shift: End users' frustration with their IT organizations will lead them to take on IT roles themselves and turn outside the company for IT help. The result, the report says, "is often an adversarial relationship between [IT] professionals and nontechnical business users."

IT professionals "need to become more aware that they are businesspeople with an IT speciality," says Kenneth A. Rose, senior distributed computing analyst at AmeriGas Propane in King of Prussia, Pa., a supplier of propane fuel. "Without this understanding and without taking responsibility for what that means, IT people will still be viewed as expendables."

To develop that awareness, Peter Dupre, CIO at office supply distributor W. B. Mason Inc. in Brockton, Mass., mandates that his IT people do stints in customer service functions, such as taking telephone orders. "They get a real look at what makes the company tick day in and day out," he says. "We want to be the people who know how everything works everywhere in the company."

8 IT learning expands scope outside technical training. When Dupre has to hire, he looks for intelligence and character. "If I can find a nice, smart person, I can teach him anything," he says. His staff of eight, who are "real generalists" within IT, support 500 users. "We don't need a lot of people because the people we have can do a lot of things," he says.



We want to be the people who know how everything works everywhere in the company.

PETER DUPRE, CIO, W. B. MASON INC.

And Jodie Ray, CIO at Brinker International, a Dallas-based restaurant corporation, says his organization is "very aggressive about training and development." He uses that not only as a recruiting and retention tool, but also as a way to grow his staff's skills base. Brinker requires its IT staff to take at least 40 hours per year in technical training and team development skills. Ray says he wants people with a wide array of skills who can work with different teams.

The flip side of that? As companies sprinkle IT functions around the organization and focus more on the uses of technology, most technology-intensive skills will become of secondary importance. They could either be outsourced or, if not on the payroll already, contracted out when needed.

9 IT organizations develop rapid-response capabilities to react to changes in technology and within their companies' markets. Like an army division ready to mobilize on a moment's notice, the IT organization will need to be able to quickly respond to change.

To do that, says Burris, IT must understand the business in which it operates, simplify the IT infrastructure so that the business can implement a technology solution faster and have easy access to skills — inside and outside the organization — to accomplish the technological end of the business' goals.

A firm that does that well, Burris says, is BMG Entertainment (*www.bmg.com*) in New York, the global music and entertainment giant with big-name artists such as Aretha Franklin, the Backstreet Boys and David Bowie. BMG deals with many different technologies because of constant change in the music industry, Burris says.

J. Scott Dinsdale, BMG's executive vice president, CIO and chief technology officer, says being able to respond to change quickly begins at the top. "All executives are engaged in strategic dialogue," he says, so "strategy changes don't come as a surprise."

A step down, a company needs the right people so it can accomplish anything, especially "clear, terrific project managers" who assume accountability, Dinsdale says. They will then know where to look for the right people to do the job, whether inside the company or contracted from outside.

10 The year 2000 problem will unleash a deeper understanding of IT by the rest of the business – for better or worse. Hero or scapegoat? Depending on the company, the IT organization could wind up with either label next January. Regardless, the year 2000 problem will raise IT's profile across the enterprise.

About half of the 340 CIOs in the Korn/Ferry study see the year 2000 problem as a "blessing in disguise" for their organizations, drawing attention to IT's importance to the company.

Sheinheit sees the year 2000 problem as an IT upgrade opportunity.

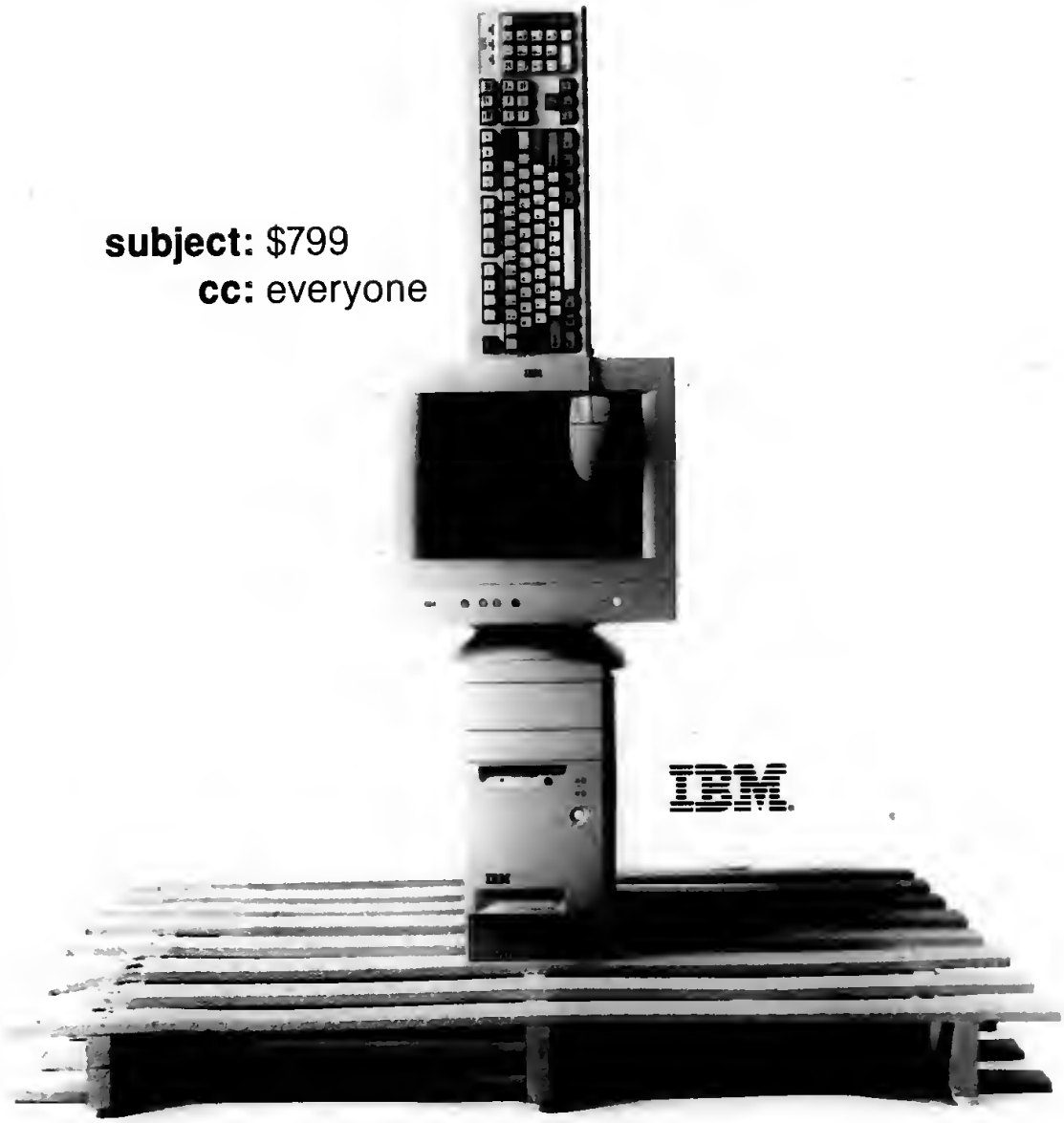
"What we want to have coming out of [year 2000] is not the same thing just fixed; we want to have something better," he says. "That gives us a stronger platform on which to move forward. I really think that companies that are out in tune with this way of thinking will be left behind."

Saia is Computerworld's *senior editor, Managing. You can contact him at rick_saia@computerworld.com.*

*Estimated reseller price to end users for model 6287-32U. Actual prices may vary. Monitor sold separately. Certain features described below are available for an additional charge. SystemXtra is available to credit qualified commercial, state and local government customers with valid credit for a 36-month term. †SuccessLease is offered and administered in the U.S. and Canada by Fidelity Leasing Inc., an approved provider of financing for IBM Global Financing. Monthly lease costs are provided by Fidelity Leasing and are for a 24-month term, full-payout lease, to qualified business customers only. A documentation fee and first month payment due at lease signing. Any taxes are additional. Other terms and financing structures are available. mhz denotes microprocessor internal clock speed; other factors may also affect application performance. gb=1 billion bytes for Hard Disk Drive capacity. PCs referenced in this ad include an operating system. IBM product names are trademarks of International Business Machines Corporation. Intel and the Intel Inside logo are registered trademarks and Celeron is a trademark of Intel Corporation. ©1999 IBM Corp. All rights reserved.

intel inside
celeron™

subject: $799
cc: everyone



	price	specs	everyone
the new PC 300GL	from $799* lease $40/mo†	Intel® Celeron™ processor 366 mhz / 4 slots, 4 bays up to 64mb sdram / up to 84gb hard drive option. ethernet and token ring adapters option. 32mb / 64mb / 128mb memory dimms	The new PC 300GL. It's relief to users (no more slow old pc's). It's relief for IS staff (heavy-duty network management features). And it's relief to finance (very, very affordable). Could this be all things to all people? ibm.com/ibmpc or 800 426 7255, ext. 4131

e-business tools

Tomorrow's IT: The People

Get ready for more business technologists, more non-technologists and more user involvement in your IT staff

By Bronwyn Fryer

WHEN JACK CRAWFORD, senior group vice president at $15 billion The Hartford Financial Services Group Inc., scans the information technology horizon, he sees a lot of business-savvy technologists.

"Over the next five years, embodying the IT function in the business will only get stronger," Crawford says.

Translation: The old glass house will finally shatter. IT will assume a strategic business function rather than a supportive one. And people who can speak both the language of the business and the language of technology will be tomorrow's corporate leaders.

Crawford's sentiments are echoed by his counterparts at other companies. Earlier this year, *Computerworld* conducted in-depth interviews with technology heads at 24 leading companies in a variety of industries. Those interviewed included CIOs, IT vice presidents and directors at such corporate powerhouses as BellSouth Corp., Nabisco Inc., The Chase Manhattan Bank, Charles Schwab & Co. and The McGraw-Hill Cos. as well as a few IT vendor companies like 3Com Corp., Computer Associates International Inc. and Northern Telecom Inc. Based on their responses, a picture begins to emerge of the next three to five years in IT departments.

In nearly all cases, those we interviewed recognized the critical importance of marrying business and IT functions. The chief reason is the increasing value of technology in all aspects of a company's business. Half of those interviewed spoke about the increasing influence of the "nets" — the Internet, intranets and extranets — in their businesses. Others talked about the effect of globalization and consolidation on their industries.

Point of No Return

Overall, IT leaders agree that there's no going back to the glass house.

"IT can no longer operate in its own little, closed world," says Jodie Ray, CIO at Brinker International Inc., a $1.8 billion food services company in Dallas. "We expect to see more joint projects that will be shared between IT and other departments. We [will be] doing joint budgeting with other departments and looking at joint staffing requirements."

As business and IT functions mesh, technology leaders say they expect their departments to change in various ways.

For example, nine of those interviewed say they believe that more CIOs will report directly to the CEO of the company in the future, because IT is increasingly seen as a strategic, rather than an administrative or financial, function within the company.

IT leaders predict that the people who will rise to the top of their organizations will likely be those with skills in areas such as project management, enterprise resource management, systems engineering and database management. They are the new breed of business technologists. Those with skills in object-oriented programming techniques will also take center stage, as corporate IT departments work to become more resource-efficient.

As IT folk learn to work smarter, some CIOs say, their departments may shrink. "The organization in five years is going to be a lot thinner than it is today," says Peter Julian, CIO at Philadelphia's Crown Cork and Seal Co., an $8 billion manufacturer of packaging products. Julian predicts that companies will choose to retain only those people with critical skills and outsource the legacy-system maintenance work.

Others predict that the shared-services model of IT — in which teams of technologists and business-side workers hunker down together to design information delivery systems — will prevail during the next few years.

Some companies such as The Hartford are already headed down the shared services road. The company, based in Hartford, Conn., has set up a 400-person in-house "Technology Services Company" in which IT specialists act as consultants, working on project assignments throughout the company.

"This has given us the opportunity to recruit some very skilled talent from consulting firms as well as to keep superior people who enjoy new challenges in a variety of settings," Crawford says.

Users Get Involved

As the marriage between business and IT occurs, many technology leaders say they believe that IT specialists will stop trying to second-guess users in designing applications and interfaces. Rather, users will begin to take a much more active role in building the tools they need, particularly with enterprise resource planning systems.

"Users will be much more involved in application

development and in creating [ways] to view data," says Don Castle, CIO at Nabisco in East Hanover, N.J. "The users [will] do a larger percentage of the configuration."

Likewise, as users become more technologically savvy, IT personnel will increasingly take on the role of systems integrators, interviewees say. "Systems people are the voice of reason in the company and make great businesspeople because they solve problems [using] scientific methods," says one CIO who asked not to be identified. "The strongest companies will have more systems people woven into the business and more businesspeople [who are] taught to adopt analytical thought processes."



CARDINAL HEALTH'S KATHY BRITTAIN WHITE: "We try to get new people bonded with the organization and encourage loyalty and long-term commitment"

Staffing Shortage

Asked whether the current IT labor shortage will continue past the year 2000, all but two of those interviewed said they believe it will. To address staffing shortages, most respondents said they will continue recruiting efforts at colleges and universities, and some said they will continue programs through which they offer internships to college and high school students.

Others, however, said they are attempting to attract and retain talent by improving the quality of the workplace, aiming to get on "Best Places to Work" lists by offering competitive salaries, flexible hours and a buffet of benefits.

"We try hard to get new people bonded with the organization and encourage loyalty and long-term commitment by organizing get-togethers where our people can have fun," says Kathy Brittain White, CIO at Cardinal Health Inc., a $4.6 billion health care service company in Dublin, Ohio.

Working Smarter

Still others talked about working smarter. Fred Matteson, executive vice president of IT services at San Francisco-based Charles Schwab, says that because his company competes with Silicon Valley for tough-to-find talent, "We have to engineer our way out of the labor shortage" because Schwab "will never be able to find" the number of new people it needs.

To that end, Matteson says, "creating a culture that encourages reuse" through the use of enterprise objects is his company's goal.

He also plans to look beyond IT itself. "Some of the best IT professionals in the future may not come from technology at all," Matteson says.

Areas such as finance, operations and administration will provide additional IT manpower, some CIOs we interviewed predict.

Despite what they see as an ongoing skills crunch, most IT leaders don't see a dramatic increase in outsourcing. Thirteen of those interviewed believe instead that there will be a moderate increase in the use of outside technology partners, eight say they expect use of outsourcers to stay level, and three say they expect outsourcing to decrease.

With regard to the future, the CIOs we interviewed were generous in their advice for IT executives and professionals.

Topping the list of words to the wise: Keep on top of technology changes, be flexible and be assertive in working with users and others in and outside the company.

Constant Learning

"Openness and constant learning from others is what is going to make companies and people successful," says Richard Diesk, executive director of corporate IT at $6 billion Cummins Engine Co. in Columbus, Ind.

IT leaders also reiterated that technical people with the ability to understand business needs and processes would have a rosy future. "IS professionals who are only in it for the technology should try to get close to the business, because when you do, your value goes up dramatically," says G. L. Kohlenberger, CIO at Fairfax, Virginia-based Mobil Corp. "A sensitivity to what IT brings to the business is crucial."

Conversely, those who fail to adapt to this brave new world won't survive, several CIOs suggested. "Computer professionals need to be more aware that they are 'businesspeople with an IT specialty,'" says Kenneth Rose, senior distributed computing analyst at $900 million AmeriGas Propane in King of Prussia, Pa. IT people who lack this understanding and fail to "take responsibility for what it means," Rose says, "will be viewed as expendable."

Fryer is a freelance writer in Santa Cruz, Calif.

> Over the next five years, embodying the IT function in the business will only get stronger.
>
> JACK CRAWFORD, SENIOR GROUP VICE PRESIDENT, THE HARTFORD FINANCIAL SERVICES GROUP INC., HARTFORD, CONN.

> We expect to see more joint projects that will be shared between IT and other departments. We [will be] doing joint budgeting with other departments and looking at joint staffing requirements.
>
> JODIE RAY, CIO, BRINKER INTERNATIONAL INC., DALLAS

> The organization in five years is going to be a lot thinner than it is today.
>
> PETER JULIAR, CIO, CROWN CORK AND SEAL CO., PHILADELPHIA

> Some of the best IT professionals in the future may not come from technology at all.
>
> FRED MATTESON, EXECUTIVE VICE PRESIDENT OF IT SERVICES, CHARLES SCHWAB & CO., SAN FRANCISCO

Tomorrow's IT: The Tech

CIOs say network infrastructure, electronic commerce, reusable code and a mobile workforce are the challenges of the future By Kevin Burden

THE TECHNOLOGIES making the most noise in the market aren't necessarily the ones keeping CIOs up at night. Information technology types in the trenches may be sweating over issues such as the battle between Linux and Windows 2000, but according to 26 CIOs, those aren't the technologies that will have the greatest impact on the future of their organizations. Their sights are set on far more imposing endeavors, according to a CIO survey conducted for *Computerworld* by Market Data Group LLC in Framingham, Mass.

We noticed that most of the CIOs' responses fit snugly into four main technology areas: network infrastructure, electronic commerce, reusable code and technologies to support mobile workers.

Nearly every CIO had something to say about at least one of those technologies, and some noted that their knowledge and progress in those areas aren't what they should be. They said most of their efforts have been centered on ensuring their systems are intact when the calendar strikes 2000.

"We've been so focused on Y2K, we honestly haven't looked much beyond it," says Richard Dlesk, executive director of corporate IT at Cummins Engine Co. in Columbus, Ind. The speed at which Cummins has shifted investments to infrastructure and intranet technologies has Dlesk concentrating on what opportunities they might bring, but he says he's leery of integrating immature technologies.

Because the challenge in deploying such broad and critical technologies is knowing where you want to end up, we asked a team of analysts at Gartner Group Inc. where IT departments should be in five years — and to provide CIOs with tips on how to get there.

Network Infrastructure

"Network connections across enterprises will be as important in five years as the network handling the enterprise itself," says Jay Pultz, vice president of networking at Gartner Group. Networks today have largely been one-dimensional, focused on connecting locations within the enterprise, but the future is in virtual corporations where enterprises are closely tied to suppliers and customers, Pultz says.

Companies are starting to connect to one another through electronic data interchange links and virtual private networks (VPN), "but that's child's play compared to the type of interaction we think will be required in the next five years," Pultz says.

The technology to build virtual corporations will extend from today's VPNs, with marked improvements to quality of service and connection reliability. So Pultz recommends that companies start working with today's technology, even though VPNs will look much different in the years to come. "VPNs of the future will be separate from the Internet at large but will still be based on IP fabrics, so much of the technology will still be applicable," he says.

However, the larger issue will be how to manage virtual corporations. Who takes responsibility for the networks? How do you troubleshoot across multiple networks? "We expect this to fall into the domain of service providers," Pultz says.

Application-Aware Networking

The dichotomy between what applications require from networks and how networks are designed will fade with a trend Gartner Group calls application-aware networking. Today, the beginning of that trend is called policy-enabled networking, in which intelligent networks will start to identify and prioritize data streams.

Enterprise resource planning's (ERP) stringent network requirements are among the driving forces of that trend; another is network consolidation, Pultz says. "As more traffic gets thrown onto fewer networks, the networks need to determine what traffic needs guaranteed responses and what is just e-mail."

The key to intelligent networks will be solid policy management capabilities and new switching and routing technologies that look deeper into data packets, says Mark Fabby, research director at Gartner. Some vendors are already shipping Layer 2 switches with basic flow-recognition capabilities, but Fabby says he



ANDY SHOW

Cummins Engine's Richard Dlesk says year 2000 has garnered much of the company's focus, impeding its deployment of new technologies

doesn't expect companies to turn the features on until 2001. Even then, they will be used only in tactical spot implementations, he says. "In five years, we'll see more of a broad-brush implemeotation."

Network capacities will increase 25% to 50% per year, according to Gartner research. However, because IT budgets won't grow nearly as fasi, Gartner expects an uptick in network consolidatioo and convergence as companies try to lower the per-unit cost of bandwidih.

One of the operational benefits will be fewer servers to manage, Fabby says. "The servers will be larger, but there will likely be a cost savings for users."

The downside of consolidation is the strain it can put on network backbones. The 80/20 rule of network design called for only 20% of traffic over the backbone, but consolidating servers back into the data center could reverse thai to 80% over the backbone, according to Fabby.

Mobile Workers

By 2003, one-third of the U.S. workforce will be accessing servers remotely, and 50% of those workers will still use dial-up connections, according to Cherry-Rose Anderson, a research analyst at Gartner Group. Because anyone who has worked from the road knows what it's like to be bandwidth-deprived, IT departments will be challenged to get their users the fastest dial-op options available.

Usage of copper-based Digital Subscriber Line and cable modem technologies will see the most expansion, and in five years, 80% to 90% of the U.S. population will have access to a high-speed dial-up option, Anderson says.

That means network administrators will need to ready their networks for the impact new access speeds will have, according to Fabby. "Dial-up traffic will be sent directly to the backbone," he says. "That way, it woo't bog down the rest of tbe network. But you better plan for the traffic peaks you never got in a dial-up network before."

Managing the IT needs of the increasing number of mobile workers will be another challenge. Andersoo recommends creating several mobile worker profiles that set everything from the devices required to access speeds. That way, every mobile worker will fall into a particular profile and will be set up accordingly.

Security and support products will merge, according to Anderson. Both disciplines will likely be handled through improved agent technology that will send configuration snapshots of laptops back to servers when the laptop user dials in to the server. Servers will automatically amend configurations and act as a first line of security.

Some of that's being done today, "but what is oeeded is better remote control and remote backup products," Anderson says.

Electronic Commerce

The most successful companies will be those that focus on their core competencies "and let outsourcing and business partners handle the rest," says Chuck Shih, research director of electronic commerce at Gartner.

Where today's electronic-commerce hype revolves around business-to-consumer, the future focus will be on business-to-business as companies wrap their ERP applications with electronic commerce on the front and back ends, Shih says.

It's called the extended enterprise and will be the most highly valued model in five years because companies that can optimize their external processes will get them done at lower cost than their competitors.

That model will be built upon technology that Shih calls "extended middleware applications," which will facilitate real-time collaboratioo and ensure timely changes in inventory and supply-chain applications.

Start implemeoting the extended enterprise by mapping out all your business processes, singling out which ones would be best extended to business partners. "Uoderstand your own business before doing anything," Shih says.

Then start with a single application. "Web procurement is a good e-commerce application to begin with because it extends out to suppliers and business processes involved are well-understood," Shih says.

Objects

Some CIOs may perceive component-based development as a way of simplifying application delivery, but in reality, "it's very complex, and those doing it today, we consider leaders in the industry," says Richard Hunter, vice president at Gartner.

But it's oot the technology that makes reuse complex — it's the organizational issues that many companies fall over, Hunter says. "There is no technology that you can buy that will give you high levels of reuse io the absence of a human infrastructure," be says. "There must be a process in place for identifying and acting upon reuse opportunities."

nology

> "Internet technology and the application architecture it implies is a huge challenge for us. But if it enables better supply-chain integration across trading partners, it will be a huge opportunity for our industry."
>
> RICHARD DLESK, EXECUTIVE DIRECTOR OF CORPORATE INFORMATION TECHNOLOGY, CUMMINS ENGINE CO.

> "I want our business rules to run on any platform, so encapsulating business rules into business objects is our focus. Driving it is our need for better business efficiency and the concept of reusable code."
>
> BILL SELTZER, EXECUTIVE VICE PRESIDENT AND CIO, THE OFFICE DEPOT INC.

> "But if companies don't move from that [client/server] model, they are going to have a large disadvantage competitively."
>
> PETER DUPRE, CIO, W. B. MASON CO.


NetworkWorld
AT&T buys TCI:
is a BT deal next?
COMPUTERWORLD
Y2K crunch
PC WORLD
400 MHz
Pentium IIs
THE SPEED?

IDG

TECHNOLOGY

SATELLITE TOPS LANDLINES

Two years ago, Mobil chose a satellite network instead of leased landlines to link to its 6,000 service stations. Mobil says the space-based network is faster, more reliable, less expensive and easier to manage than an earthbound net. ▸ 77

FRANKLY SPEAKING

The people who are supposed to provide IT leadership for business users are actually the biggest Luddites in the organization, Frank Hayes charges. Why aren't we searching for an edge, the way users are? ▸ 82

SUN + NETSCAPE = APP REWRITES?

Application server customers may have to rewrite large parts of some applications when Sun and Netscape merge their server software products next year. ▸ 74

CISCO TOOL ROUTES PACKETS

Policy-based networking allows network administrators to prioritize network traffic, guaranteeing bandwidth to the most critical apps. New software from Cisco uses a graphical user interface to make that task easier. ▸ 78

DOWNTIME LOW, COSTS HIGH

Squeezing out the last percentage of unplanned downtime requires a lot of extra processors, memory, disk drives, networks, middleware and application software. Several IT managers describe how they did it and how to know when it's worth the cost. ▸ 75

JAVA, SCHMAVA! C++ THRIVES

C++ may share more of the application development action with Java, but it still has some solid niches and a huge installed base to carry it into the future, users say. ▸ 74

USERS LIKE R5

Notes/Domino customers like what they see in Release 5. They're praising the improved user interface, more advanced administration tools and a design environment that lets them do much of the work. ▸ 73

QUICKSTUDY: APP SERVERS

Application servers allow users to access corporate information via the Web, while making maintenance and support very simple for IT. ▸ 86

XML MARKS SPOT

The emerging standard may help IT tame an otherwise-chaotic Web. ▸ 84

MORE

Flashback 87
Hardware 75
Networks 77
Skills Scope 88
Software 73



ONLINE AIRFARES: ALL PAIN, NO GAIN

YOU DON'T SAVE that much, and you lose a lot of time, says *Computerworld* technology evaluations editor Cynthia Morgan, who shopped for flights on six popular online travel sites. Her pick? A real, live travel agent. OK, the travel agent came in second to Microsoft's Expedia. But for all the time and aggravation spent trolling for the best deal, it's worth it to pay a travel agent an extra $12 to do all the work for you.

80





IT'S NOT HOW MUCH YOU READ.

You can read a knee-high stack of computer magazines each month and still not find the depth and breadth of news and information you'll discover each week in the pages of *Computerworld.*

As the only weekly newspaper for IT professionals, *Computerworld* is filled with up-to-the-minute articles on topics ranging from products and people to trends and technology. We cover it all – PC's, workstations, mainframes, client/server computing, networking, communications, open systems, World Wide Web, intranets, and more.

It's everything you need to know to get an edge on the competition.

*Publisher's own data as of 1 II '99

IT'S WHAT YOU READ.

That's why over 205,707* IT professionals subscribe to *Computerworld.* Shouldn't you?

Order *Computerworld* and you'll receive 51 information-packed issues. Call us toll-free at **1-800-343-6474** or visit us on the World Wide Web at http://www.computerworld.com. And get your own copy of *Computerworld.*

Then you can spend less time reading about the world of information systems. And more time conquering it.

COMPUTERWORLD
The Newspaper for IT Leaders

NOTES USERS GIVE R5 A THUMBS-UP

New Web server and design capabilities make a move to R5 worth the time

BY KEVIN BURDEN

LOTUS DEVELOPMENT Corp.'s Notes/Domino Release 5, rolled out earlier this month, may be as revolutionary as Notes was when it first arrived. Users taking their first look said they immediately noticed vast improvements to the user interface, more advanced administration tools and one of the finest environments on the market for designing Web applications.

But first things first: Release 5 doesn't eliminate any of the reasons why users would choose Notes/Domino over rivals like Microsoft Corp.'s Exchange or Novell Inc.'s GroupWise, according to David Marshak, an analyst at Patricia Seybold Group in Boston. "As an application platform, [Notes/Domino is] superior to anything out there. R5 just reinforces that," he said.

Actually, Release 5's Web server and design capabilities may be the best reasoo to upgrade, users said. Because Versioo 4.5 was "barely adequate as a Web server," Marshak said, those still on it will want to upgrade fast. Version 4.6 was a "good" Web server, Marshak added, but even those users who agree with that assessment say R5 changes the process of building Web sites by off-loading many design chores to users.

The Designer client let Allied Domecq Wines in Healdsburg, Calif., hand off design to its marketing department. "Ninety percent of our site was done by someone that hadn't touched HTML until R5," said Victor Ramensky, director of information technology at Allied Domecq. "In 4.6, design had to be very IT-centric."

That's changed through new elements in Release 5 that allow pages to display any data type without the need for fields or layout regions. Lotus also added outlines for organizing all the elements of a site.

But oo advance was more important than the inclusion of Java applets, said Cliff Denker, manager of groupware at BASF Corp. in Mount Olive, N.J. Release 5 complies more strictly with Web standards such as Java than previous versions, according to Denker. "It's why we are now planning to connect R5 to our enterprise applications," he said.

Tools a Plus

IT managers also applauded the administratioo tools in Release 5. "[They] are burying all the third-party products and LotusScript we had to use in the past," Ramensky said.

However, the browserlike interface of the Notes client hasn't persuaded those users to use Notes as their Web browser. Though that would mean one fewer application on the desktop, they're concerned Lotus won't keep Notes current with the latest versions of fast-changing Web technologies such as Java.

"I'm not convinced Lotus will be as disciplined as Microsoft and Netscape with new revisinns," Denker said.

Sun/Netscape Server App Customers Brace for Integration

Expect some code rewriting to accompany installation of product

BY CAROL SLIWA

The merging of application servers from Netscape Communications Corp. and Sun Microsystems Inc. could mean extra work for corporate customers — and perhaps cause some to re-evaluate their buying decisions.

Under the alliance, Sun will co-develop and market Netscape's software as part of a deal with America Online Inc., which recently bought Netscape. Most of the unified product line — including an Alliance application server — is due to ship in next year's first quarter.

The Sun/Netscape "Alliance" application server promises to fuse the best of Sun's NetDynamics software and Netscape's product. But analysts and users doubt the vendors can meet that aggressive schedule for such a difficult project.

And corporate customers that have already built Web-based applications to work with either the Netscape or Sun product typically have substantial amounts of code tied to one or the other. If the Sun/Netscape Alliance migration tools are insufficient, those companies could have to rewrite or redesign significant portions of the application code.

For instance, Catherine A. T. Susch, a senior manager at Ernst & Young LLP's Systems Development & Technology division, estimated that 25,000 of the 170,000 lines of code for one Web application might have to be rewritten at a cost of three man-months of work.

"I think it's going to be very tricky," Susch said. Her New York-based division has been using Netscape's Application Server to build Web applications for four large corporations, including one that lets Standard & Poor's corporate customers access risk assessment ratings from their browsers.

The group is faced with the questions: "Do we continue to develop on that platform?" and "What do we do with the previous applications developed on that platform?" Susch said.

Susch estimated that 60% of the application code is application-specific workflow logic, while the remaining 40% represents cross-application business objects and database access r-les. The workflow code

Code, page 74

Looking Ahead: Planned Alliance Servers

Product road map for Sun/Netscape alliance:

SERVER TYPE	NETSCAPE	SUN	ALLIANCE
Messaging	Version 4.1, early Q2 1999	Version 4.0, summer 1999	Version 5.0, Q1 2000
Calendar	Version 4.0, Q2 1999	No new version this year	Version 5.0, Q1 2000
Web	Enterprise 4.0, early Q3 1999	No new version this year	Enterprise 5.0, Q1 2000
	Fast Track 4.0, early Q3 1999		Fast Track 5.0, Q1 2000
Application	NAS 4.0, May 1999	NetDynamics 5.0, March 1999	Version 6.0, Q1 2000
Directory/ Security	No new version this year	Secure Net 3.0, summer 1999	Version 5.0, second-half 1999
Meta Directory	No existing version	No existing version	Second-half 1999
Certificate Management Suite	Announced in January 1999	No existing version	Version 4.0, first-half 1999

SOURCE: SUN MICROSYSTEMS INC., NETSCAPE COMMUNICATIONS CORP.

BRIEFS

PeopleSoft to Embed Finance Tools

PeopleSoft Inc. has announced plans to embed financial analysis tools developed by Berkeley, Calif.-based Financial Engineering Associates in its treasury management application. Included are libraries of analysis routines for evaluating financial market risks that could affect the value of corporate investments. The tools will be added to the PeopleSoft software in an upgrade due in the third quarter.
www.peoplesoft.com

Thru-Put Adds Integration Utility

San Jose-based Thru-Put Technologies Inc. last week released a software integration utility for use in connecting its supply-chain planning application to enterprise resource planning systems. The DB-Util software feeds transaction data to Thru-Put's planning tool and cleans up the information to eliminate duplicate records and inconsistencies. It's available as an add-on to Thru-Put Manufacturing 5, which starts at $185,000.
www.thru-put.com

Scala to Roll Out E-Commerce Suite

Scala Business Solutions N.V., a Dutch software vendor with U.S. headquarters in Maitland, Fla., next month plans to add an electronic-commerce package, E-Solutions, to its Windows NT-based line of enterprise resource planning applications for midsize users and divisions of multinational companies. Pricing hasn't been finalized.
www.scala-na.com

SAP Module Upgrade

Legato Systems Inc. in Palo Alto, Calif., has announced Legato NetWorker BusineSuite Module 1.3 for SAP R/3 on Oracle. The module offers cluster-aware fail-over of backup and recovery services for SAP AG's R/3 running on Oracle Corp. databases, the company said.

The NT client costs $3,000; the Unix client costs $12,000.
www.legato.com

Continued from page 73

Rewriting Application Code Makes for 'Tricky' Transition

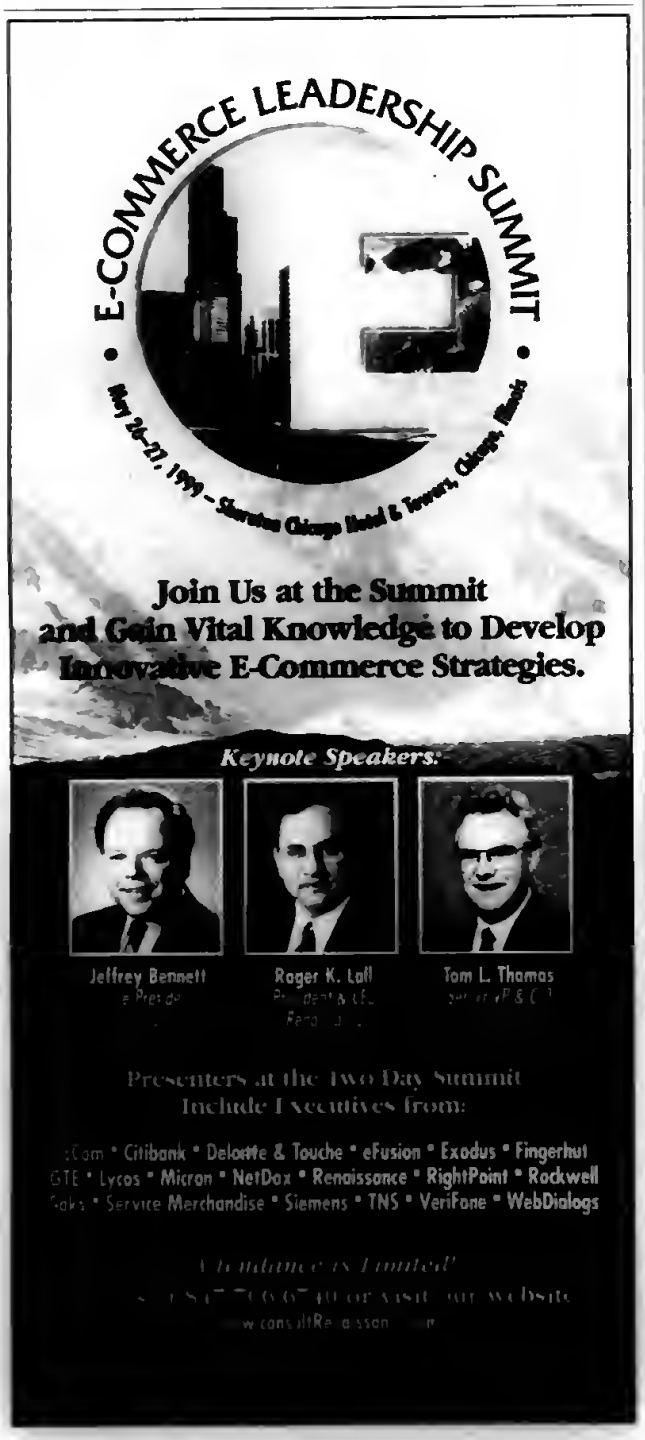
is the part that "most likely" will have to be reworked, Susch said.

While waiting for the Alliance application server, Ernst & Young expects to restructure applications to the Enterprise JavaBeans model as a first step, Susch said.

"We're going to have to ready the code for the transition, so that by the time the new version comes out, we'll be ready," Susch said. "It's not all rewrite. It's more about rethinking the navigation and the workflow."

Another big Netscape Application Server user, ETrade Group Inc. in Palo Alto, Calif., estimates that only 30% custom code is tied to the product. Debra Chrapaty, president and chief operating officer of ETrade Technologies, is optimistic that the Netscape/Sun Alliance will be responsive to her company's needs. "They've listened to my concerns," she said.

ETrade Group also has been using products from BEA Systems Inc. and Oracle Corp., both of which have application servers. Asked whether she considered any contingency plans, Chrapaty said, "I would be a very foolish president of a company if I didn't know how they played into my current design and what it would take me to make a migration if I were forced to do that."



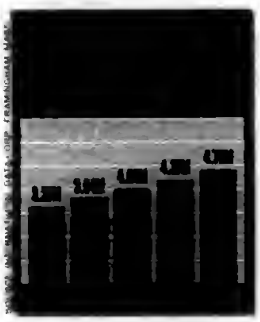
C++ THRIVES IN ERA OF JAVA

Solid niches, huge installed base carries it into the future

BY DAVID ORENSTEIN

JEFF HERR, lead technical specialist at the Options Clearing Corp. (OCC) in Chicago, sees the future of C++ this way: Java will never replace C++ the way C++ never replaced Cobol.

Recent developer surveys and interviews indicate that even though C++ will share more of the development load with the fast-growing Java language, it will still shoulder the burden of the most performance-intensive application tasks, such as multithreading and transaction processing.



International Data Corp. (IDC) recently projected that C and C++ use will hold its own for several years to come, and could even grow (see chart).

And a survey last month by *Computerworld* of 107 IT managers showed that even as Java races forward, C++'s installed base probably won't slip. Although 13% of the managers surveyed said their company's applications are already written in C++, the same percentage said C++ will be the most important language in the future. That stability comes despite a major shift in development to Web environments.

Compared with Java or rapid application development tools such as Visual Basic, C++ can be difficult to use because it requires developers to manage memory manually. But skilled coders prefer to have manual control over memory. Unlike Java, C++ code is native to each platform rather than relying on a virtual machine. And unlike Visual Basic, C++ is available on most major platforms.

Developers at OCC used Java to build a Web interface for a risk management application but stayed with C++ to handle the data and calculation-intensive logic on the server side, Herr said. The application is a large part of OCC's core service to brokers. "For the heavy-duty processing, the kind of things that must run every day because it is our business, we are staying with C++," he said.

C++ is also the code in which most commercial software packages are written. That's one reason The Boeing Co.'s manufacturing operations in Seattle use it extensively, said systems integration manager Van Cleland. Until interfaces to the packages require something else, he said, there is no reason to change.

Microsoft Corp. could drive much of the C++ growth if the company makes its Visual C++ tool easier to use with its Component Object Model (COM) standard and the Internet, said IDC analyst Steven Hendrick. Microsoft last October announced plans to ease the integration of C++ and COM by including new syntax that relieves developers from writing Interface Definition Language to describe C++ components to COM.

Fatbrain.com Inc., a retailer of computer books in Sunnyvale, Calif., uses C++ and Active Server pages for its electronic-commerce applications. Informal company benchmark tests have found C++ performs faster than Java, said company co-founder Kim Orumchian.

BRIEFS

Fujitsu Notebook

Fujitsu PC Corp. has announced the LifeBook L470, a notebook computer with a 366-MHz mobile Pentium II processor. The system weighs less than 4.5 lb. and is 1.1 in. thick, according to the Milpitas, Calif., company. It features 64M bytes of RAM, a 4.3G-byte hard drive and a 56K bit/sec. internal modem.

Pricing starts at $2,999.

www.fujitsu-pc.com

Servers Support NT, Unix, Mainframe Apps

Bull Information Systems Inc. has announced 12 DPS 7000 servers that can support both mainframe and open (Unix or Windows NT) applications. According to the Billerica, Mass., company, the servers incorporate both the GCOS 7 processor for mainframe processing and the Open 7 for open systems processing. Pricing ranges from $145,000 to $3.9 million.

www.us.bull.com

Plasmon NAS Device

Plasmon Data Inc. has announced AutoTower, a network-attached storage device with a digital video disc-RAM library. The tower has a 9G-byte hard drive for storage caching, according to the Eden Prairie, Minn., company.

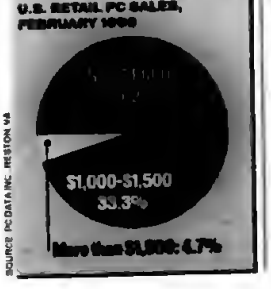
A unit with two drives and 120 slots costs about $15,000.

www.plasmon.com

PC Price Check

AVERAGE PC PRICE	
February 1998	$1,108
January 1999	$944
February 1999	$947

U.S. RETAIL PC SALES, FEBRUARY 1999



SOURCE: PC DATA INC., RESTON, VA

THE PRICEY ROAD TO 99.99% UPTIME

If you want downtime of just an hour per year, you have to be sure it's worth it

BY JAIKUMAR VIJAYAN

WHAT A difference in downtime a few digits can make.

If you think getting to 99% system availability is hard to achieve, just try getting to 99.99%.

For an operatioo that runs 24 hours per day, it's the difference between having an average of 3.6 days of unplanned downtime per year and less than 53 minutes of outage in the same period.

Squeezing out those extra hours of uptime requires that end-user connections, processors, memory, disk drives, networks, middleware, applicatioo software and the operating system are virtually outage-free, said Ajay Singh, manager of research and development at United Air Lines Inc. in Elk Grove Village, Ill.

Operational and system management procedures also need to be in place to maintain the system and recover from failures as quickly as possible.

The issue is becoming increasingly important as new applications, including Internet and enterprise resource planning applications, increase the costs of downtime. Vendors such as Hewlett-Packard Co., IBM and Sun Microsystems Inc. have begun offering new services that guarantee ever-higher levels of availability. HP, for instance, claims that it will soon be able to guarantee 99.999% applicatioo-level availability.

AVAILABILITY	CUMULATIVE UNPLANNED DOWNTIME PER YEAR
99.9999%	32 seconds
99.999%	5 minutes
99.99%	53 minutes
99.9%	8.8 hours
99%	3.6 days
90%	36.5 days

Uptime Rising

United was able to push uptime levels on a crucial ticket forecasting system from 98.4% in 1997 to 99.1% last year mainly by boosting its RS/6000 SP systems with $1.5 million worth of new disk space, extra processors and high-availability clustering software.

But moving to an even higher level will require building fully redundant databases and mirroring almost all systems and the network. "We are talking a lot of investment here, and the question then becomes, 'Is it worth it?' " said Singh, who estimated that United stands to lose $250,000 in lost ticket opportunities each time a forecast is missed.

Health-First Inc. a hospital chain in Brevard County, Fla., dramatically improved its system uptime to just over 99.99% during the past three years. An unwieldy mix of nonstandard hardware and software had led to high levels of system downtime, said Mark Amey, director of technical services. Since then, the company has standardized oo a mix of Unix and NetWare servers and a new high-availability Asynchronous Transfer Mode network aimed at limiting downtime to a few minutes per year.

The company needs such availahility because downtime costs an estimated $200,000 in lost productivity every hour. But reaching 99.99% uptime has meant working with multiple vendors on the hardware, software and network front and being able to manage it all.

"You need to develop the internal expertise for inplementing and using these systems. You might have the world's most highly available system, but if you don't know how to set it up and manage it," there's little benefit, Amey said.

Compaq Introduces New Storage-Area Network Tools

BY NANCY WEIL

Compaq Computer Corp. last week rolled out new storage-area network (SAN) software for enterprises.

The company released the StorageWorks Enterprise Storage Array 12000 (ESA12000) and RAID Array 8000 (RA8000). Customers can configure the arrays using new eight- and 16-port Fibre Channel switches

A 400G-byte switched-fabric SAN with an RA8000 system and a Fibre Channel eight-port switch starts at $105,000.

Pricing for a IT-byte switched-fabric SAN using the ESA12000 and a 16-port switch starts at $192,500.

A 5T-byte SAN starts at $738,000.

Compaq also introduced disaster-tolerant StorageWorks Data Replicatioo Manager software and switched-fabric SANs for the RA8000 and ESA12000 systems. The software replicates data online in real time at local and remote sites at Fibre Channel speeds of 100M byte/sec. and at distances of up to 10 km between the sites.

The data-replication manager is available now for Windows NT, with additional operating system support [illegible] ed in the next two qu[illegible] configuration that [illegible] IT byte of data starts [illegible] $470,000 for software and hardware.

Weil writes for the IDG News Service in Boston.

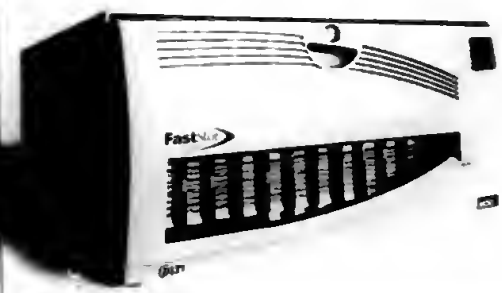
ADIC ANNOUNCES DIGITAL LIBRARY

Advanced Digital Information Corp. (ADIC) has announced FastStor 22, a digital linear tape (DLT) robotic library.

The autoloader can house 22 tapes and one tape drive. It offers more than 1.5T bytes of capacity with 2-to-1 compression and can back up data at up to 600M byte/min., according to the Redmond, Wash., company. Both DLT 4000 drives and DLT 7000 drives are supported.

Pricing starts at $7,995.

www.adic.com



One advantage to not having old technology.



We don't have to try selling it to you.

Unlike communications companies that have been around forever, we're not stuck with an outdated network we'll try dumping on you. Whatever you need: Frame Relay, ATM or IP, Qwest is the network that delivers it better. Because Qwest is the network with bandwidth to spare. So if you're looking for a better return on your IT investments, visit us at **qwest.com** and find out why *not* having old technology can work to your advantage.

ride the light

Qwest.

SATELLITE NETWORK CUTS COSTS, OUTAGES

Mobil finds network in space is cheaper, easier to manage than leased landlines

BY MATT HAMBLEN

WHEN MOBIL Corp. in Fairfax, Va., installed a two-way satellite network in 1997 to link its point-of-sale applications at 6,000 service stations to a central database, it hit on an innovation that continues to grow.

The network has lowered operating costs, increased connection reliability and enabled $69 billion Mobil to implement improvements such as the Speedpass program that helps 2.3 million customers save time at the gas pump, Mobil officials said.

Ease of Use

"It's an easier network to manage and control [and] a much better marketing and sales tool," said Terry Kueker, implementation manager for the Very Small Aperture Terminal (VSAT) project at Mobil.

The Speedpass system was enabled with a VSAT network built by Hughes Network Systems Inc. in Germantown, Md. It has created an 8% increase in data traffic for Mobil, Kueker said.

Analysts described the Mobil VSAT network as the second largest in the U.S., behind a network built by General Motors Corp. The U.S. Postal Service is building a VSAT network that will be the biggest, connecting 25,000 post offices.

The most significant benefit Mobil realized in picking the satellite system from Hughes over a landline network was gaining broad reach to service stations in 28 states, analysts said.

"VSAT is a viable alternative to frame relay and some other traditional networks, especially for somebody like Mobil [that's] trying to serve so many states," said analyst Jose del Rosario at Frost & Sullivan Inc. in Mountain View, Calif.

Satellite systems are also reliable, analysts said. Incidents such as the satellite that veered off-course in space last year, causing a two-day pager outage, affect only about 2% of total satellite time in any given year.

Mobil officials wouldn't divulge the cost of their satellite network because the company is in a quiet period, with its merger with Exxon Corp. pending. But Mobil has saved on the cost of leasing lines from multiple telephone companies, company officials said.

Installing, operating and maintaining a VSAT system costs $125 to $175 per month for each location on the network, Hughes officials said. "It's much easier for us to manage," said Bill Pragman, manager of computer and network operations at Mobil.



WHEN A MOBIL CUSTOMER waves his Speedpass at a pump, data is sent to a rooftop dish, where it begins a journey that ends in a data center in Kansas

"Before, we had leased lines from maybe 30 to 40 carriers. And before, we couldn't tell where in a link was the outage," Pragman said. Daily outages per station averaged two hours previously, compared with only 20 minutes under VSAT, he added.

Mobil avoided a costly upgrade of its point-of-sale equipment when Hughes built software to convert traffic from a proprietary asynchronous protocol used on the previous network to Internet Protocol packets. When a customer waves his Speedpass radio transponder at a pump or seeks authorization via credit card, the data goes to a rooftop dish, up to a satellite and then down to a Hughes hub in Minneapolis, where it travels across multiple T1 lines to Mobil's Lenexa, Kan., data center.

From there, an authorization might be shipped to a bank or other credit-card company, and the approval or denial is shot back to the user. The entire process takes only three seconds — about two seconds faster than under the old patchwork network.

Kueker said VSAT allows easy migration to newer point-of-sale technologies, such as touch-screen applications. The network also might be linked to fuel-tank monitoring devices, he said.

Equity analyst Adam Sieminski at Alex. Brown & Sons Inc. in Baltimore said Mobil's pending merger with Exxon is likely to produce an expansion of Speedpass and other innovations because the new, $250 billion entity will have the capital to handle such projects.

But Sieminski said Mobil needs to expand Speedpass to more sites than the 3,500 service stations where it's now installed if the program is to be as effective as possible. "I've driven to the Shell [station] down the street in Baltimore because I couldn't get my Speedpass to work," Sieminski said.

VSAT also increased the reliability of network transmissions from 99.6% to 99.8%. That will save nearly 1 million lost credit-card transactions per year, based on a daily average of 1.2 million transactions.



SECURITY CONCERNS have hindered the widespread use of satellite networks

Satellite Networks May Be Ready To Shed 'Niche' Label

Network analysts describe satellite networks as a **niche market**, with high levels of acceptance still years away. But they also said that distrust of wireless networks is slowly breaking down as the use of consumer satellite dishes and cellular phones booms.

Terry Kueker, VSAT project implementation manager at Mobil, said VSAT might not work in, for example, an online network that requires quick response time. But **Mobil** is using it for large downloads of software and files to its stations as well as for traffic for point-of-sale authorizations, which tends to travel in bursts.

Analysts said VSAT costs have dropped in the last two years, with starting prices of **$4,000**. Hughes Network Systems has also set up a hub that's shared by users, which is less expensive than the hubs customers once created for themselves at a cost of **$1 million or more.** – *Matt Hamblen*

BRIEFS

New CyberCop Suite

Network Associates Inc. has announced CyberCop 5.0, an intrusion-protection suite comprising the Santa Clara, Calif., vendor's CyberCop Scanner, CyberCop Sting and CyberCop Monitor tools.

The suite costs $17 per seat for a 1,000-user license.

www.nai.com

Memotec Adds Multiservice Switch

Memotec Communications Inc. is shipping the CX950, a multiservice access switch for data, voice and video convergence over a choice of WAN services. Positioned for central and regional site offices, the CX950 integrates analog and digital compressed voice, video, legacy data and LAN traffic over services including Asynchronous Transfer Mode, frame relay, IP and Integrated Services Digital Network.

Pricing starts at $4,500.

www.memotec.com

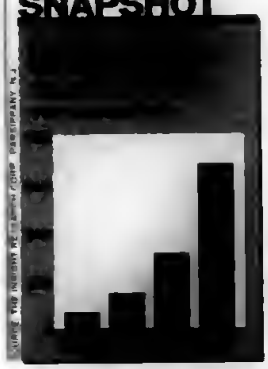
Exchange App Revamp

MessageWise Inc. is shipping InLook 1.2, application management software for Microsoft Corp.'s Exchange e-mail server. According to the Ottawa company, the Windows-based tool helps administrators collect information about message queues, usage statistics and service levels. It can monitor corporate servers for unauthorized configuration changes during a year 2000 lockdown period.

Pricing for the software starts at $995 per server.

www.messagewise.com

SNAPSHOT



Cisco Software Package Could Ease Policy-Based Networking Chores

BY BOB WALLACE

A new Cisco Systems Inc. software package promises to ease the introduction of so-called policy-based networking by simplifying an otherwise time-consuming setup process.

Dubbed Cisco QoS Policy Manager, the offering for Windows NT includes a graphical user interface that companies can use in place of the vendor's existing command-line interface to create policies for handling traffic from different applications.

With policy-based networking, administrators can prioritize network applications and create rules, called policies, that guarantee bandwidth to the most business-critical applications when the network is congested.

The policies are sent to switches and routers, which enforce them.

"What QoS Policy Manager lets you do is select an application, enter a source and destination IP address and specify the amount of desired bandwidth between what could be your desktop and an [enterprise resource planning] application on a data-center server," said John Morency, a vice president at Renaissance Worldwide Inc., a Newton, Mass., consulting and research firm.

"You get that dedicated bandwidth whenever you need it," he said.

High Praise

One Cisco user is high on the product. "It's much easier to create and manage policies using the graphical user interface than the text-based approach," said Bill Gemza, director of IT projects at United Water Resources Inc. in Harrington Park, N.J.

The automatic distribution of policies to network devices saves staff from having to make changes to those switches and routers, he added.

The utility is sold on policy-based networking because "we want to optimize our bandwidth and give mission-critical applications top priority," Gemza said.

"And as we add applications, [controlling] bandwidth will become even more critical," he said.

Cisco QoS Policy Manager 1.0, which is shipping now, costs $25,000.

LET THE FACTS

Policy Perks

Benefits of QoS Policy Manager 1.0:

- Lets you profile key applications
- Can define and validate policies
- Can activate quality-of-service (QoS)
- Lets you distribute policies
- Gives report results

SOURCE: CISCO SYSTEMS INC., SAN JOSE



Clean, dependable power is an increasingly critical part of the information technology system. Luckily, there is a power management and power protection solution that ensures the availability of your essential systems.

Introducing Powerware. It's not just our name; it's what we do. And we do it better than anyone else.

Powerware (formerly Exide Electronics) is a global leader in providing total UPS solutions for every hardware and software application, from the largest enterprise-wide networks to desktop computers. Powerware products are backed by the most advanced software, giving you unmatched control and predictability. And only Powerware

BRIEFS

Portable Projector

Proxima Corp. in San Diego last week announced the UltraLight LXI, a portable projector designed for multimedia presentations. The product weighs 8.6 pounds and includes an 800-lumen lighting system for brightness, with 1,024- by 768-pixel resolution.

The projector costs $4,999.
www.proxima.com

RAD Framework

Treev Inc. has announced Treev 2000, a rapid application development framework for developing client/server and Web-based document management applications. Based on Microsoft Corp. standards, the software suite provides engines for imaging, enterprise report management, workflow and document management, according to the Herndon, Va., company.

The product's core engines for Windows NT cost $20,000 each.
www.treev.com

PageVault Adds Security Tool

Authentica Security Technologies Inc. is shipping PageVault, security software designed to protect every copy of a specific document before, during and after delivery.

PageVault is an exportable client/server application that uses encryption and Internet technology to protect digital information wherever it goes, according to the Waltham, Mass., company. It controls who can see a document, which pages are available and where, when and for how long they can be viewed.

Pricing starts at $13,995 for a 100-user license.
www.authentica-security.com

Help Desk Tools Debut

Remedy Corp. is shipping three new help desk tools: Remedy Help Desk 4.0, Remedy Service Level Agreements 4.0 and Remedy Action-Center Suite.

Help Desk assists support personnel with problem avoidance, problem management and problem resolution, according to the Mountain View, Calif., company. Service Level Agreements lets users define and assign service levels. Action-Center Suite combines Help Desk with a Java client and Web access for self-support.

Pricing starts at $12,000 for a three-user system.
www.remedy.com

CRM App Rates Customer Behavior

A new customer relationship management (CRM) tool that measures customer behavior is now shipping from Quadstone Ltd. in Boston. Called Transactionhouse, the tool was designed to help business analysts in the banking, insurance, retail and telecommunications industries. Once users create a customer model, the product can score customers based on attributes such as likelihood to defect, propensity to buy and profitability. Pricing begins at $70,000 for data sets of up to 1 million customers.
www.quadstone.com

AND FINALLY, POWERWARE.

provides unsurpassed on-site service and support.

Today, Powerware takes its place beside software and hardware. Because ensuring reliable power is as crucial as the technology it serves.

To learn more about how to keep your systems up and running, call us at 800-554-3448. Or visit our Web site at **www.powerware.com.**

POWERWARE®
POWERING THE WORLD

Reservations Online

My Travel Agent: 1 Online Agents: 0

BY CYNTHIA MORGAN

I'M NOT EXACTLY the "doo't mind me, I'll stay at the Y" type, so I look for paioless ways to shave the travel budget. I tested six of the best-known online agencies against my (very human) corporate travel agent to see if having control of my travel destiny could reduce the prices I pay for air travel.

My experiences were less than encouraging. I didn't save that much by using online travel sites — and I lost a great deal of time.

My corporate travel agent came in second place, after Microsoft Corp.'s Expedia.

But to save all the hassle of checking the six online agencies, I'd gladly pay the less than $15 average difference per trip that it would cost me to use a travel agent.

I priced round-trip tickets for seven trips, specifying a morning departure where possible.

I chose local and cross-country flights as well as domestic and international, including and excluding Saturday night stays (U.S. round-trip flights with a Saturday night stay were as much as $1,500 cheaper than weekday-only travel).

The best prices go quickly oo any airline reservatioo system, so timing is critical.

I avoided the possibility that one service might score on a special that wasn't available a few hours later by simply making each reservation simultaneously on all services. I turned up a surprisingly wide range of prices for identical trips.

The least expensive, Microsoft's Expedia, priced all seven trips at a total of $3,333.27. Travelocity was last at $4,786.80 — a $1,453.53 difference.

I also looked at the airlines' own online reservation systems, a disappointing side trip. Often they were harder to use, displayed already-full flights and (naturally) restricted you to one airline.

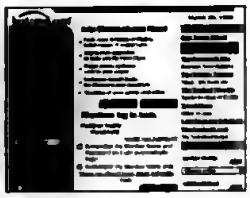
Many had trouble distinguishing betweeo first-class and coach fares.

I gave up when United Air Lines Inc. determined that the lowest possible fare for a round trip between Boston and San Francisco was $9,989.50 (Expedia charged $572).

One exception: American Airlines, which generally met or beat my best prices and featured a remarkably easy-to-use interface.

Unfortuoately, its flight range limited it to less than half of my test trips.

BizTravel.com



www.biztravel.com
BizTravel.com Inc.
Ease of use: C+
Value: D

BizTravel's shtick is finding flights that maximize your frequent-flier miles. It had the most extensive profiling system I encountered (outside of the travel

I'd gladly pay the less than $15 average difference per trip that it would cost me to use a travel agent.

How Our Human Travel Agent Stacked Up

We pitted our travel agent against several well-known travel sites. You can see that our travel agent found most of the lowest fares, but the overall average best fares goes to the Expedia site. Figures in red represent the lowest fares.

	Travel Agent	Expedia	TheTrip	BizTravel	Flife	Travelocity	Preview (domestic only)	Average cost
Boston to San Francisco Sunday to Wednesday	$744.59	**$572.00**	$1,229.51	$1,570.50	$1,999.50	$1,999.50	$1,374.50	$1,355.73
Boston to San Francisco Saturday stay	**$312.96**	$354.00	$354.00	$354.00	$354.00	$354.00	$354.00	$348.05
Wash. National to London Sunday to Saturday	**$807.40**	$812.04	$812.04	$812.04	$793.50	$812.10	NA	$808.19
Wash. National to London Saturday stay	$671.40	**$650.04**	$672.32	**$650.04**	$674.40	$676.10	NA	$665.72
Boston to Marseilles Three weeks	$439.00	$439.19	**$438.86**	$439.19	$439.10	$439.10	NA	$439.07
Lexington, Ky., to Phoenix Monday-Friday	**$254.80**	$290.00	$290.00	$296.00	$290.00	$290.00	$296.00	$286.66
Los Angeles to Seattle Saturday to Thursday	**$185.09**	$216.00	$216.00	$216.00	$216.00	$216.00	$216.00	$211.58
Total cost of all trips	$3,414.44	**$3,333.27**	$4,012.73	$4,337.77	$4,766.50	$4,786.80	NA	$4,108.59

NA=not available

THE TRIPS (all reservations made at least 14 days in advance)

- **Boston to San Francisco** round-trip, leaving 4/16/99, returning 4/21/99 (no Saturday stay)
- **Boston to San Francisco** round-trip, leaving 4/17/99, returning 4/21/99 (including Sat. stay)
- **Washington National to London (Heathrow)** leaving 6/20/99, returning 6/26/99 (no Sat. stay)
- **Washington National to London (Heathrow)**, leaving 6/15/99, returning 6/26/99 (Sat. stay)
- **Boston to Marseilles, France**, leaving 5/20/99, returning 6/10/99 (Sat. stay)
- **Lexington, Ky., to Phoenix**, leaving 4/15/99, returning 4/22/99 (Sat. stay)
- **Lexington, Ky., to Phoenix**, leaving 4/12/99, returning 4/16/99 (no Sat. stay)



LARRY ROSSI

agent) and even requested the e-mail addresses of people who should receive copies of my itineraries. The system was also easy to use, at times easier than Expedia.

On the downside, BizTravel required my credit-card information before it let me check flights, which is way outside my security comfort zone. Maximizing frequent-flier miles apparently comes at some cost; BizTravel placed only fourth in overall flight costs.

Expedia



www.expedia.com
Microsoft Corp.
Ease of use: B-
Value: A

Expedia offered the best combination of ease-of-use and low fares of any electronic system I tried.

It includes a "lowest possible fare" service, returning an absolute rock-bottom price for your destination as a benchmark, with tips for getting close to it in currently available flights.

The service was especially adept at finding low-priced domestic flights – especially without a Saturday night stay – and at understanding requests for international destinations.

Expedia will also set up a "fare watch" for destinations you specify, sending e-mail when an especially low fare becomes available. This is less useful than it sounds, since they seem to arrive right after I've made the trip.

Expedia isn't particularly good with multilegged trips (in which you visit multiple cities) and chooses flight combinations for you, so you lose control of flight times. But its $572 Boston-to-San Francisco fare, without a Saturday night stay, was less than half the average price. That slipped the service into first place for low-priced fares.

Travelogix Flifo

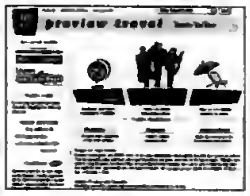


www.flifo.com
Itravel.com Inc.
Ease of use: C-
Value: D-

Flifo asks you to choose your flights without benefit of pricing, which generally resulted in outrageous fares. Thankfully, it also gives its own best shot at finding the lowest fare for your destination.

Trouble is, you'll probably find better prices elsewhere. Travelogix Flifo was the second-highest service for overall travel costs.

PreviewTravel



www.previewtravel.com
PreviewTravel Inc.
Ease of use: B+
Value: D

Preview offers the convenient "rock-bottom" price-finding system also found in Expedia and is much better at setting up multileg trips. You can choose your own flight combinations, something you can't do in Expedia, and unlike other "choose your flight before you know the price" services, PreviewTravel clearly shows how much each leg will cost.

Unfortunately, PreviewTravel can't make international reservations, which took it out of the running for best all-around reservation system. And the domestic fares it could find placed it only fourth in this group.

TheTrip



www.thetrip.com
TheTrip.com Inc.
Ease of use: F
Value: C-

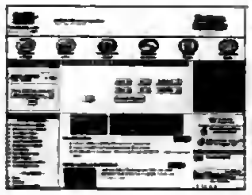
TheTrip scores highest in irritation. Its navigation scheme is primitive: You're forced to start over every time you'd like to try a different flight option unless you make judicious use of the "back" button. And the service forces you to select the flights you want without benefit of prices, then rather smugly shows the flights you should have picked to save money.

Fortunately, those fares really were low; TheTrip placed third in overall fare costs.

And free membership in TheTrip includes an extremely useful electronic newsletter.

A site redesign would make this a valuable service.

Travelocity



www.travelocity.com
The Sabre Group Inc.
Ease of use: D+
Value: D-

Travel services that asked me to pick the flights before I saw the fares were generally the worst at saving money – and Travelocity was no exception.

It proved especially expensive for trips without a Saturday night stay; the best it could do was tie the cheapest fares to short domestic hops. Nor was it particularly easy to use.

Human agent

American Express
Ease of use: A++
Value: B+

The human reservation system that we use at *Computerworld* was the only one capable of accepting travel requests in batch mode (I simply gave the agent my list of trips and received flights in return).

It also accepted travel requests in electronic, fax and paper formats and was easily voice-controlled; the online systems required submission through their own, sometimes obscure reservation forms.

The agent maintains an extensive travel profile that incorporates my employer's travel restrictions, applying a unique combination of fuzzy logic and learning capabilities to improve the quality of service with each session. There's also an around-the-clock emergency number for after-hours help.

If it's a choice between modern technology with lots of work and more primitive means with no work, well . . . call me old-fashioned.

Total fare cost was only $81 more than the Expedia's rock-bottom prices for all seven trips.

I'll gladly pay an extra $11.60 per trip over Expedia for the convenience.

Know the code

You can save time and a lot of aggravation if you use the **three-letter airport code** when making reservations at both ends of your trip. This is especially true for international flights.

Most of the online systems I tested, except for Expedia, mistook "Marseilles, France" for "Muncie, Indiana" and "New Delhi, India" for "Marina Del Rey, California." Entering **"MRS"** and **"DEL"** returned correct locations every time.

Priceline.com

Priceline.com, an online auction house for unused airline seats, is either a real budget-slasher or the travel equivalent of Russian roulette, depending on whom you ask. I'm leaning toward the latter, myself.

On the plus side, airlines bid for a chance to sell you a ticket based on a fare you choose. On the minus end, you commit to buying the ticket two or three days before you actually get it, so you won't know exactly when you're flying or which airline you've chosen until you're already committed.

On the plus side, Priceline does honor frequent-flier miles. But although it advertises international travel, none of my test trips abroad got anything but error messages.

There's no opportunity to check fares, so you must do your homework to figure out what's a fair price before making a bid. My airline dropped prices on the flight I requested between the time I bid and the time I was notified that I had "won." My Priceline ticket was actually $50 more than if I'd purchased it from the airline.

I definitely got more than I'd bargained for. Stranded by a flight-canceling blizzard in St. Louis, airline ticket agents refused to honor my ticket without authorization from Priceline. They were wrong – that ticket should have been treated like any other – but Priceline was closed for the holidays and unreachable. Three days and several missed flights later, I finally caught a flight home.

The system must work for someone, however. Priceline's sales are skyrocketing and the company is adding hotel rooms, car sales and mortgages to its offerings.

Me? I'll stick with the travel agent. ▶

BRIEFS

Sun Ships Solaris PC Netlink

Sun Microsystems Inc. last week shipped its Solaris PC Netlink software, previously code-named Project Cascade. The software lets Sun's Solaris Unix servers provide native Windows NT network services. It will be bundled at an extra cost on Sun's corporate servers. Sun last week also shipped a coprocessor card that lets users run Windows NT on Solaris workstations.
www.sun.com

IBM Adds 64-bit RS/6000

IBM last week boosted its RS/6000 server family with the new 64-bit Model H70. The new AIX Unix server is powered by up to four IBM RS64-II chips and delivers up to 70% greater application-level performance at the same price as its predecessor, the H50, according to IBM. The system can run 32- and 64-bit applications concurrently or one at a time without rebooting the operating system.
www.ibm.com

KL Group Unveils JProbe Suite

KL Group Inc. in Toronto last week released JProbe Suite, a tool set designed to help developers locate thread, memory and performance problems in their Java applications.

The Developer Edition is priced at $999; the Professional Edition costs $1,899.
www.klgroup.com

Net Research Center Launched

IBM, Northwestern University and other partners last week launched the International Center for Advanced Internet Research in Schaumberg, Ill., to enable collaboration among researchers creating advanced Internet applications. The center plans to leverage projects to deploy breakthrough interactive applications with corporate customers.

Riverbed Mobile Development Tool

Riverbed Technologies has released ScoutMTS 3.0, a Windows development platform for mobile computing data exchange. The software helps developers integrate wireless and other handheld devices into legacy, enterprise resource planning and workflow systems without requiring a companion PC, according to the Vienna, Va., company.

Pricing for the software begins at $995.
www.riverbedtech.com

'Clone' Your PC

The Buddy PC kit from Vega Technologies lets users create "virtual," or "clone," PCs that share an existing PC's software and processing power. With a Buddy PC connection kit, which is a second monitor and a second keyboard, users tap in to the resources of an existing PC. Buddy takes the application the second user wants and treats it like a Windows screen, according to the Emeryville, Calif., company.

The kit costs $149.95.
www.vegatechnologies.com

Spyglass and Microsoft in Pact

Spyglass Inc. last week announced a strategic agreement that calls for Microsoft Corp. to pay $20 million over three years for technology and services to speed development of products based on Microsoft's Windows CE operating system. The products will be targeted at the Web device market.

FRANKLY SPEAKING/FRANK HAYES

All hail King Ludd!

A GUY CALLED ME LAST WEEK wanting to know what I thought about software engineering. This Japanese research lab is working on a new software development methodology, he said. Are U.S. IT shops going to be interested in something like this? It'll be a tough sell, I told him. Corporate IT shops that already have a methodology have invested heavily in what they've got — they're not likely to switch. And most shops don't have a methodology and don't seem to want one, so they're not likely to buy in.

Which is actually pretty funny, I thought as I hung up the phooe. Here we are, bip-deep in tecbnology, the people who are supposed to provide IT leadership for our business users. And we're actually the biggest Luddites in the organization.

Oh, we're not afraid of our own technology. Luddites never are. But we strongly resist whatever new, uncomfortable IT changes our users, our company's business partners and plain old competition might force down our throats.

Think that's oot true? What's your reactioo when you discover users down in sales have been swapping data from their Palm handhelds across your oetworks? Do you rusb down to find out how well their jury-rigged system works and what you can do to help?

Or what about when you find out a big customer's new supply-chain managemeot system will soon have to connect to your networks? Do you call your counterpart at the customer's IT shop to arrange a quick demo and see bow you can make that connection an advantage for your company — and not just a necessary chore to keep the customer happy?

If you don't get excited and energized about other people's new technology — if you just see the IT that users, customers and soppliers adopt as more trouble for you — well, let's face it, you deserve the name Luddite.

Want more evidence? There's a reason software engineering is such a hard sell. Wheo was the last time your programmers showed any enthusiasm for a new way of building software projects?

Whether it's called software engineering or best practices or a methodology, tbey probably hate it, sight unseen, just on principle. No surprise there — developers figure there's nothing broken in the way they write software, so why fix it?

But that's a delusion — and ooe your users don't share. Actually, it's two delusions. Users know that "oot brokeo" iso't good enough. That's why they keep draggiog in new gadgets, new techniques, new information. They're looking for an edge, a way to get a lot better fast. If a bandheld computer, a training class or a marketing study provides that edge, tbey'll grab it.

Why isn't IT searching for an edge, the way users are?



And users also know that bow we write software isn't "not broken." Software writing is horribly broken. It takes too loog and turns out buggy software that doeso't do what's needed.

Users aren't happy with the result. Neither are programmers. But it's the best we can do with our "not broken" way of writing code.

Why aren't we searchiog for an edge, the way our users are? Why aren't we constantly trying out new products and approaches that might make us more productive and effective? Why are we so much less technologically adventurous than users?

I'm not sure. And I don't know whether any particular product or methodology or set of best practices would give us that kind of edge in software developmeot, or anywhere else io the IT shop.

But one thing seems certain: Most of us aren't trying to find out. And until they're forced on us by business partners and users, we'll keep dodging new technologies as long as we can.

King Ludd would be proud.

Hayes, Computerworld's staff columnist, has covered IT for 20 years. His e-mail address is frank_hayes@computerworld.com.



At Rogue Wave, we've always been known as the leader in flexible object-oriented software components for distributed and heterogeneous application development. Now, we've created Rogue Wave InterNet Architecture (RNA). RNA provides a complete framework of connectable components for building interoperable applications that provide rapid access to diverse information sources—over the Internet and throughout the enterprise. Internet components and connectivity that simply work. So the next time you think connectable components, think Rogue Wave Software. **Get a free white paper "RNA: A Component Framework for Internet Applications" at www.roguewave.com/ad/RNA**

Rogue Wave SOFTWARE

Components Without Limits

USA: 800-487-3217 • D.A.CH.: +49-6103-59 34-0 • UK: +44-118-988 0224 • France: +33-1-4196 2626
Italy: +39-02-3809 3288 • Rest of Europe: +31-20-301 26 26 • All others: 303-473-9118

©1999 Rogue Wave Software, Inc. Rogue Wave is a registered trademark of Rogue Wave Software, Inc. All other trademarks are the property of their respective holders.

XML MARKS THE SPOT

The new Web language is ready to redefine information management

By Jon Udell

SUN MICROSYSTEMS' SCOTT MCNEALY is right: The network *is* the computer. The Web has become that computer's operating system. And the lingua franca of that computer will be Extensible Markup Language, better known as XML. It's much more than just a way to present Web pages: In XML, the document *becomes* the database.

XML's rigid code structure (content is placed between standard code markers known as tags) allows other applications to easily retrieve and use that content. Each XML document becomes a data repository that can be queried just like any other database. Unfortunately, there's no system of rules to govern how Web pages package data and define methods to operate on that data. The result? Today's Internet is a vast, unruly collection of HTML, JavaScript and Java on the client side and a grab bag of scripted and compiled languages on the server side.

The Glue That Binds

XML addresses those problems head-on, organizing all of that barely-defined chaos into a single, unified framework. Data that was formerly stored haphazardly in HTML pages can now be placed into rigorously structured XML pages. Netscape Communications Corp.'s and Microsoft Corp.'s Version 5.x-generation browsers, which are XML-aware, can absorb and manipulate

that data far more effectively than the Versioo 4.x browsers can handle sloppy old HTML.

Better still, other XML-aware applications, oot just browsers, can also manipulate that data. Most notably, a new generation of electronic data interchange-like services will be able to link business processes by using XML to define service application programming interfaces (API) and format message payloads.

Still a fledgling technology, XML is often called "HTML on steroids." Others tbink of it as a simplified version of the old-fashioned Standard Generalized Markup Language (SGML) that gave birtb to HTML. But though there's some truth to both visions, XML isn't just another markup language. It's rapidly becoming the key enabler of the emerging, object-oriented Web.

Applying strict information-management discipline to documeot collections has been a serious concern for many precision-driven operations.

At The Boeing Co., for example, the documentation for a 777 jetliner must be engineered as precisely as any other component of the airplane. The company uses SGML and Document Type Definitions (DTD) to define the schemas for that document database and employs parser-based tools that can literally take a document apart, analyze its components and catalog them appropriately. Writing manuals with SGML is much more complicated up front, but the documentatioo that results can be easily validated and its content transformed later on for other purposes.

Lax Enforcement

Though HTML is defined by an SGML DTD, browsers have never been very strict about enforcing it. But that laxity was actually a good thing in the early days of the Ioternet: It made Webpage authoring a snap and let anyone get into the Web game easily. But now that HTML has become the language of the Net, sloppiness is less tolerable.

XML adds the rigor and precisioo of SGML without affecting the buge installed base of HTML pages already on the Internet. It does that vety cleverly, by simplifying the rules for defining DTDs —or, in some cases, not eveo requiring a DTD. That means that the billions of HTML pages already existing on the Web require little additional work to become XML-compliant.

Here's a typical HTML fragment:

```
<img src=/img/fig1.jpg>
```

Here's the equivalent XML:

```
<img src="/img/fig1.jpg"/>
```

Not much difference, is there? Only a few minor changes can turn yesterday's HTML code into today's XML. But those changes — putting the attribute ("/img/fig1.jpg," which identifies the file "fig1.jpg" as an image) in quotes and adding a second forward-slash to close the statement — expresses that statement in well-formed XML that can be mechanically parsed with no ambiguity. An XML page is as much a database as a document because every field that can be identified, or parsed, can contain specific data that other applications can reliably identify, extract and transform.

Explorer Options

Microsoft's just-released Ioternet Explorer 5.0 can convert a page of XML into an object that can be rendered directly, using an Extensible Stylesheet Language (XSL) style sheet. Or it can be used iodirectly by extracting relevant parts of the page using Microsoft's VBScript or ECMAscript code and plugging them in to the browser's Document Object Model. Netscape's upcoming 5.0 browser will have similar capabilities.

> XML is often called 'HTML on steroids.'

But Web browsing is only part of the story. Web pages mediate a growing array of business processes: electronically tracking packages, buying office supplies, trading stocks. And increasingly, it's the other business processes — not just people sitting in front of a computer — that are using those pages.

Eventually, XML will define the service APIs for business-to-business integration. It's now defining the structure of the data packets exchanged among cooperating businesses. It's even helping to manage that data by way of object-oriented databases, such as ObjectStore and Poet, that now support bindings to XML. And most crucially, it's doing all those things in a way that's highly compatible with the Internet's existing HTML base and its tradition of simple and open standards.

Harvey Bowring Online, a Web site run by a U.K.-based credit insurer, provides a stunning example. Customers arrive at the site, log in, choose one of 17 million registered companies and insure their trade against bad debt and insolvency with one of those compaoies.

Bowring uses Dun & Bradstreet Software's (D&B) new GlobalAccess tool kit to issue XML-formatted queries to D&B, receive XML-formatted data packets in response, feed the data into a risk-analysis process and sell tbe customer an automatically calculated, safe amount of insurance. Fairfax, Va.-based webMethods Inc.'s B2B Integration Server relays the XML-formatted queries to D&B's Global Data Authority, the XML-based interface to a hodgepodge of D&B mainframes, Web sites and other data sources.

XML Pluses

At each stage, both the request/response protocols and data payloads are expressed in XML. That means:

- It works everywbere. Electronic data interchange (EDI) is no stranger to D&B — the company's been using it for years. But EDI value-added networks don't, and likely won't, have the global reacb of D&B and its customers.
- The data is accessible through standard HTTP (or HTTPS, which is secure HTTP) Web protocol connections, so there are nn problems getting through firewalls.
- There's no ambiguity among the browsers or other applications needing to access the data. XML DTDs govern the protocols and data employed for the data — a guarantee of compatibility.
- Interoperability. Although both the webMethods server at D&B and the D&B tool kit at Bowring were used to create that application, all of its parts can interoperate with other XML-aware tools.

Distributed Component Object Model, Common Object Request Broker Architecture and Internet Inter-ORB Protocol were supposed to usher in the object-oriented Web. They haven't. XML can — and it will deliver much more than smarter Web pages.

Udell is a Web developer, author and consultant in New Hampshire. His book, Practical Internet Groupware, will be out later this year.

XML Applications to Watch:

Channel Definition Format (CDF)
www.microsoft.com/workshop/delivery/channel/reference/channels.asp

CDF is an XML vocabulary that defines Internet Explorer Active Channels and PointCast channels.

Financial Information Exchange Markup Language (FIXML)
www.fixprotocol.org/cgi-bin/tbox/newdoc.cgi?doc=2/workgroups/standards/download/wpaper.html

Financial Informatron Exchange (FIX) is the protocol for the real-time exchange of securities transactions jointly managed by a group of asset-management and brokerage firms. Currently, FIX developers must write applicahon-level code to validate the structure of FIX messages.

The proposed FIXML standard would standardize the processing of FIX messages and enable nonprocedural (DTD-based) validation of the structural integrity of those messages. Innovasion announced its first application of FIXML in late February.

Open Financial Exchange (OFX)
www.ofx.net

OFX is a request/response protocol for financial transactions and a representation framework for electronically transmitted bundles of financial data. Client implementations include Microsoft's Money and Intuit Inc.'s Quicken. Server implementations include Canopy Software Inc.'s Canopy Server and Inteldata Technologies Corp.'s Interpose OFX.

Open Software Distribution (OSD)
www.w3.org/tr/note-osd.html, www.microsoft.com/workshop/management/osd/osdfaq.asp

OSD is an XML vocabulary for describing a software distribution package as a "bill of materials" and defining relationships and dependencies among its parts. OSD-based software distribution implementers include Marimba Inc.'s Castanet, Microsoft's Internet Explorer, Novell Inc.'s ZENworks and ActiveState Tool Corp.'s Win32 Perl

Resource Description Framework (RDF)
www.w3.org/TR/PR-rdf-syntax/

RDF is a metalanguage, written in XML, that defines resources (such as sites, pages and page elements) and can express complex relationships among them. Netscape's Open Directory Project (*http://directory.netscape.com/*), a cooperative, Yahoo-like Web directory, stores all its category information and links in RDF format.

Web Distributed Data Exchange (WDDX)
www.wddx.org/

WDDX is one of several XML-based remote procedure call technologies. Invented by Allaire Corp. and then released as an open standard, WDDX defines a neutral format for program variables, which can pass between networked applications written in a variety of languages: JavaScript, Java, Perl, Cold Fusion or any Component Object Model-capable language.

Web Interface Definition Language (WIDL)
www.webmethods.com/

WIDL is an XML vocabulary that describes Web-server-based services as well as structured data. WebMethod's B2B Integration Server uses WIDL to formalize the APIs implicitly supported by Web sites.

– *Jon Udell*

Application Servers

BY CRAIG STEDMAN

YOU WANT to use the Web to let internal users or your customers look at corporate information. But you want to keep installation at the user end simple, and you don't want just anyone to get into your databases.

That may be where an application server enters the picture. These software packages, typically written in the Java programming language for use on Windows NT-based systems, act as go-betweens linking browser-equipped end users to the databases that hold the information they need to access.

Application servers manage the process of connecting users to that data. They set up an application session for each user, check identifications, fetch requested information from the appropriate database and build the data in to a Web page to serve directly to the users.

DEFINITION

An application server is software that provides services to support Web-based applications that tie end users to corporate databases. It acts as a middleman between Web browsers and the database servers, so firms don't need to install high-maintenance Windows applications at the user end.

The software "gives you all the geoeric things that you need to have between the page in a [user's] Web browser and what you have in your database," says Jim Blankenship, lead design engineer at a division of San Francisco-based Transamerica Corp. that's using an application server to make a database of real estate information available to customers via the Internet. (See schematic at right and Q&A, below left).

What that means is that little or no application code needs to be installed at each end user's PC, making it possible to develop thin-client applications — server-based software that runs in a Web browser and requires minimal desktop support.

The goal of applicatioo servers "is very simple," says Sally Cusack, an analyst at Interoational Data Corp. io Framingham, Mass.: "Thin clients everywhere." All of the code required to run an application is basically built in to the server software, she adds.

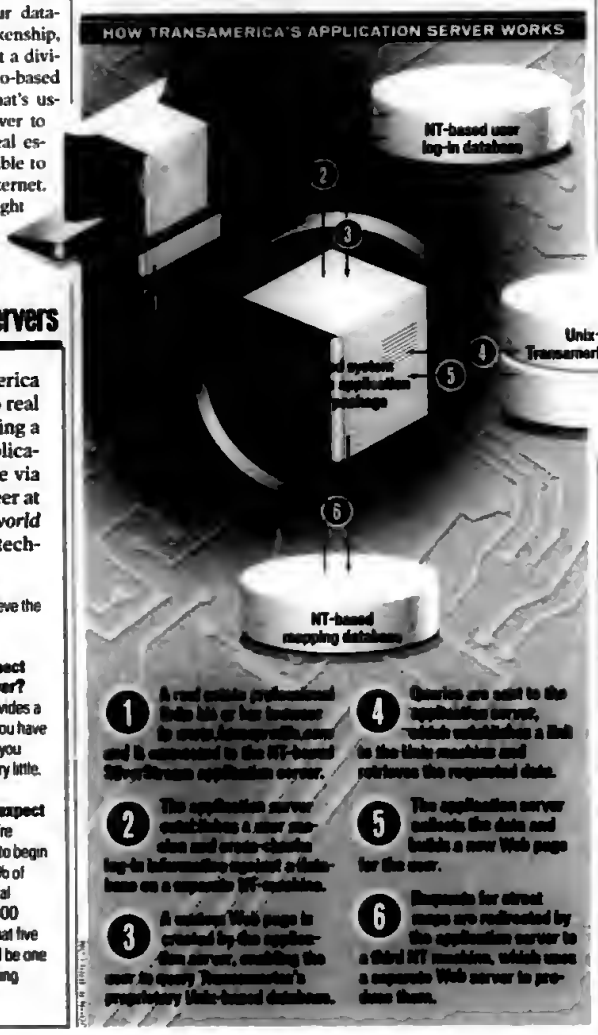
Applicatioo server software packages, which by some counts are being sold by more than 40 vendors, also provide application management services such as monitoring system performance to sniff out bottlenecks. And they can be tied together to build large-scale applications that require multiple servers to meet the demands of users for data.

Adding Complexity

Companies looking to build more complex applications can hook application servers to separate software servers that process orders and other transactions and that distribute reusable chunks of application code called objects to users. Vendors such as IBM and BEA Systems Inc. are combining these technologies into a single package, Cusack says.

Craig Roth, an analyst at Meta Group Inc. in Stamford, Conn., says use of application servers is still low. For example, a 1998 Meta Group survey of 25 Fortune 1,000 companies doing business globally shows that only four of the companies surveyed had installed packaged application servers.

Many Web applications are still in pilot mode, "and it takes a while to even figure out that you need [the] services" that applicatioo server software provides, Roth says. Prices ranging from $15,000 to $100,000 can also be a barrier, he adds. But he estimates that the percentage of users with application servers will nearly double this year. ▶



Q&A Jim Blankenship On Application Servers

Transamerica Intellitech, a division of Transamerica that sells a database of real estate information to real estate agents and other professionals, is developing a system that uses SilverStream Software Inc.'s application server to hook its customers to the database via the Internet. Jim Blankenship, lead design engineer at the Transamerica unit, talked with *Computerworld* about the company's use of application server technology.

What's the application server's role in your system? It creates a user session for each customer that's dedicated to handling requests [for data] from that particular person. From there, it handles interactions such as transferring and changing Web pages, doing security control and providing database connectivity

Why did you decide to use an application server? If you're going to be offering something where the data changes on each Web page, you pretty much have to have that session-management [capability]. The users aren't coming in and accessing static Web pages. You have to be able to execute the queries and retrieve the information they're after.

What benefits do you expect from the application server? One of the big things is it provides a much thinner client. Even if you have some Java source code that you distribute to the users, it's very little.

How many users do you expect to support with this? We're looking at around 1,000 just to begin with, and maybe 10% to 20% of that concurrently. But our total customer base is about 20,000 people, and we're thinking that five years down the road, this will be one of our main vehicles for offering products.

MORE ONLINE

For more information about application servers, visit our Web site
www.computerworld.com/more

Are there technologies or issues you would like to learn about in QuickStudy? Please send your ideas to QuickStudy editor Stefanie McCann at stefanie_mccann@computerworld.com.

Technology Happenings

- **The Univac I** is retired after more than 73,000 hours of operation and given to the **Smithsonian Institution.**
- **Tandy Corp.** acquires the assets of **Radio Shack** (nine stores). Charles Tandy pays nothing. Radio Shack is bankrupt; he agrees to pay the bills.
- **MIT professor Joseph Weizenbaum** develops the computer program **Eliza**, which simulates a conversation between a therapist and a patient.
- **Digital Equipment Corp.** announces the **PDP-5**, its first 12-bit minicomputer.
- **IBM** introduces the term **"word processing"** to sell dictation equipment.
- **4.5 million computer chips** are manufactured in the U.S. Eight years later, more than 600 million will be made.
- **Ivan Sutherland** publishes **Sketchpad**, an interactive computer drawing system, as his MIT doctoral thesis.

Born in 1963

- **Michael Jordan**, former NBA basketball star
- **Garry Kasparov**, chess grandmaster, who lost to IBM's supercomputer Deep Blue in 1997 after beating the computer the previous year
- **Mary Brandel**, *Computerworld* Flashback writer

Other Notables

- **Best Actor Oscar:** Sidney Poitier for *Lilies of the Field*. He was the first African-American male to receive a best actor Oscar.
- **Best Picture:** *Tom Jones*
- **Literature Pulitzer Prize:** *The Reivers*, by William Faulkner

ASCII Debuts

BY MARY BRANDEL

IF IT WEREN'T for a particular development in 1963, we wouldn't have e-mail and there would be no World Wide Web. Cursor movement, laser printers and video games — all of these owe a big debt of gratitude to this technological breakthrough.

What is it? Something most of us take for granted today: ASCII. Yep, plain old ASCII, that simplest of text formats.

To understand why ASCII (pronounced AS-KEE) is such a big deal, you have to realize that before it, different computers had no way to communicate with one another. Each manufacturer had its own way of representing letters in the alphabet, numbers and control codes. "We had over 60 different ways to represent characters in computers. It was a real Tower of Babel," says Bob Bemer, who was instrumental in ASCII's development and is widely known as "the father of ASCII."

1963

ASCII, which stands for American Standard Code for Information Interchange, functions as a common denominator between computers that otherwise have nothing in common. It works by assigning standard numeric values to letters, numbers, punctuation marks and other characters such as control codes. An uppercase "A," for example, is represented by the number 65.

All the characters used in e-mail messages are ASCII characters, as are the characters in HTML documents.

But in 1960, there was no such standardization. IBM's equipment alone used nine different character sets. "They were starting to talk about families of computers, which need to communicate. I said, 'Hey, you can't even talk to each other, let alone the outside world,'" says Bemer, who worked at IBM from 1956 to 1962.

Midway through Bemer's IBM career, this heterogeneity became a real concern. So in May 1961, Bemer submitted a proposal for a common computer code to the American National Standards Institute (ANSI). The X3.4 Committee — representing most computer manufacturers of the day and chaired by John Auwaerter, vice president of the former Teletype Corp. — was established and got right to work.

It took the ANSI committee more than two years to agree on a common code. Part of the lengthy debate was caused by self-interest. The committee had to decide whose proprietary characters were represented. "It got down to nitpicking," Bemer says. "But finally, Auwaerter and I shook hands outside of the meeting room and said, 'This is it.'" Ironically, the end result bore a strong resemblance to Bemer's original plan.

If you were to jump ahead to this year, you'd think it was smooth sailing after that. Today, ASCII is used in billions of dollars' worth of computer equipment as well as most operating systems — the exception being Windows NT, which uses the newer Unicode standard, which is only somewhat compatible with ASCII.



BOB BEMER, also known as "the father of ASCII"

However, there was an 18-year gap between the completion of ASCII in 1963 and its common acceptance. This has everything to do with IBM and its System/360, which was released in 1964. While ASCII was being developed, everyone — even IBM — assumed the company would move to the new standard. Until then, IBM used EBCDIC, an extension of the old punch-card code.

But just as ASCII became a done deal and the System/360 was ready for release, Dr. Frederick Brooks, head of IBM's OS/360 development team, told Bemer the punch cards and printers wouldn't be ready for ASCII on time. IBM tried to develop a way for the System/360 to switch between ASCII and EBCDIC, but the technique didn't work.

Until 1981, when IBM finally used ASCII in its first PC, the only ASCII computer was the Univac 1050, released in 1964 (although Teletype immediately made all of its new typewriter-like machines work in ASCII). But from that point on, ASCII became *the* standard for computer communication.

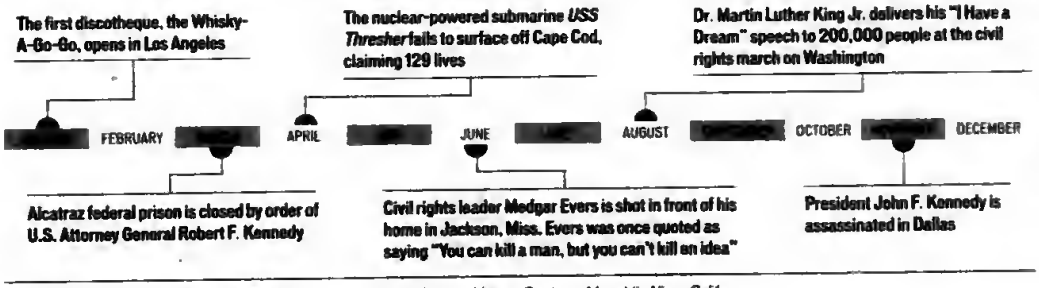
The story of ASCII wouldn't be complete without mentioning the "escape" sequence. According to Bemer, it's the most important piece of the ASCII puzzle. Early in the game, ANSI recognized that 128 characters were insufficient to accommodate a worldwide communication system. But the seven-bit limitation of the hardware at the time forbade them to go beyond that.



So Bemer developed the escape sequence, which allows the computer to break from one alphabet and enter another. Since 1963, more than 150 "extra-ASCII" alphabets have been defined.

Along with Cobol, ASCII is one of the few basic computer technologies from the 1960s that still thrives today.

Brandel is a frequent contributor to Computerworld. *Contact her at brandel@cwix.com.*



■ Flashback is produced with the assistance of The Computer Museum History Center in Mountain View, Calif.

Two for the Road Ahead?

Unix and Linux: Similar technologies, different career prospects for IT professionals

BY ALAN R. EARLS

UNIX AND LINUX — birds of a feather, yes. But one is an established career path with 30 years of proven market value, and the other, barely 8 years old, has only recently become a serious market contender. As the following roundup shows, career prospects for Unix should continue to be strong. But Linux isn't ready for prime time.

UNIX

Unix has been the magic word, spelling career success for IT professionals for 30 years. And with growth moderating for Windows NT, Unix professionals are breathing a collective sigh of relief — and looking ahead to new opportunities.

"I think Unix will always be around because of its proven scalability," says John Fjellstad, a software engineer at ProdEx Technologies in Saratoga, Calif., an NT shop where Unix is used for development work. "With the rise of Linux, you might actually find a Unix-only shop."

Unix alone can float your career boat, but broader skills are recommended to chart a steady career course. And employers in Unix-only and mixed-tech shops want proven skills and experience. Fjellstad says he began learning Unix in college and now runs Linux on his home PC to improve his proficiency and acquire system administration skills.

"You have to know the material. There is no substitute" for mastering the numerous and powerful keystroke combinations in Unix, agrees Timothy Jones, a designer/developer at Technical Resource Connection, in Tampa, Fla. Jones swears by the value of having a dedicated machine on which to run Unix or Linux.

"Unix systems are very promiscuous. They are almost always connected to networks and to large numbers of other systems," says Wes Peters, principal engineer at XMission LLC, an Internet service provider in Salt Lake City. A consequence of that penchant for interconnection is that Unix professionals need good all-around technical knowledge in order to apply Unix skills effectively.

Then there are the business and interpersonal skills that complement Unix knowledge. "You must be able to use [human] language effectively to accomplish your work goals," Peters says. He also endorses the idea of honing your skills on a home machine.

Attractive Combo

If you're able to become proficient in Unix — and particularly if you can also talk business — the market will find a home for you. For example, Bill Radford, a vice president at BellSouth Informatioo Systems in Atlanta, says the market for Unix skills in his neighborhood is "pretty tight." In his view, it's likely to grow at a steady pace in the years ahead.

The real demand will be for those with specific business skills or technical skills on top of their Unix knowledge. "We need Unix people who also understand cellular phone billing and Yellow Pages operations," Radford says.

Unix Skills Payoff

Salary premiums (additional compensation paid for a specific skill) that IT managers are paying for Unix skills:

INDUSTRY	SALARY PREMIUM
Automotive	26%
Business services*	17%
Wholesale/distribution	10%
Metal/rubber/plastic	9%
Education	9%
Financial	26%
Retail	17%
Construction	10%
Transportation	9%
Food and beverage	9%

*Non-IT

SOURCE: COMPUTERWORLD SALARY SURVEY

LINUX

Linux is more than a Unix flavor with similar multitasking, virtual memory, shared libraries and demand-loading and TCP/IP networking capabilities. It's an important contender in the server and desktop market, but to its growing legion of boosters, it's nothing less than the Next Big Thing.

But hiring managers and practitioners are offering a more careful assessment with regard to Linux career prospects.

Steven Pritchard, a contract HP-UX system administrator at a Peoria, Ill., manufacturer, sees a lot of interest in Linux across the organization — especially since major vendors began to support it — but no actual applications. However, Pritchard does consulting work and has set up Linux servers for some nearby companies and colleges.

"The demand for just Linux skills isn't all that high yet," Pritchard says. "Most of the Linux people I know don't have Linux-specific jobs."

Even so, "there is a lot of demand for people like me that know Linux" as well as Unix, he adds.

Off the Bandwagon

Gene Denney, a programmer at Scott Air Force Base in Illinois, has his doubts about the roadworthiness of the Linux bandwagon. He's currently experimenting with Linux and says those who master it will be in demand "in the future, more so than now."

Still, leading vendors such as IBM, Compaq Computer Corp. and Dell Computer Corp. are flocking to the Linux standard. Linux use grew 212% last year to claim 17% of new server shipments, according to International Data Corp. in Framingham, Mass.

Some professionals are capitalizing oo their Linux skills now. Dwayne Masters, a network security analyst at a Midwestern financial services firm, says Linux has become the operating system of choice for internal development projects.



Masters, a former senior Unix systems administrator who says he first started "playing around" with Linux on a personal workstation, credits the experience with giving him the networking, security and scripting-languages skills that helped him land his current position. He advises those who would tread the Linux path to learn by doing.

But to Tom Mangan, a vice president of information systems at Lanier Worldwide Inc. in Atlanta, Linux is more sizzle than steak. "Linux is great for someone who wants to acquire Unix skills. Maybe a very small business could use it, but I doo't see it as something for us," he says.

Earls is a freelance writer in Franklin, Mass.

> We need Unix people who also understand cellular phone billing and Yellow Pages operations.
>
> BILL RADFORD (ABOVE), BELLSOUTH INFONMATION SYSTEMS



The freedom to create. The power to innovate. These are the kinds of differences you'll see at SBC Communications, the parent company of Southwestern Bell, Pacific Bell, SNET, Nevada Bell and Cellular One. That's because we approach things a little differently. By empowering you to make importaot decisions. And developing new products and services that give our customers new ways to access their world. With your help we'll make even greater innovations possible. So bring us your ideas. And **bring IT all together at SBC Communications**.

Richardson, TX (N. Dallas)

Programmer Analyst • Analyst – DBA • Analyst – PC Development • Systems Analyst (Dallas Area)

St. Louis, MO

Mainframe/Mid-Range/Object-Oriented Application Developers • Powerbuilder Application Specialists C/C++ Application Programmers • Oracle Database Administrators • Website Developer/Webmaster

San Ramon, CA

Sr. Systems Administrator • Systems Analysts • Release Manager • Sr. Programmer Analyst Network Security Consultant (Dublin, CA)

For details on these and other IT positions, please visit our IT web pages.

www.bringITtogether.com

SBC Communications is an Equal Opportunity Employer. All qualified applicants will receive full and fair consideration for employment.

SBC

SBC Communications Inc.

Southwestern Bell PACIFIC BELL. SNET NEVADA BELL CELLULARONE

Database Design Analyst Berwyn PA & various client sites in PA DWp & implement Oracle database in UNIX & Windows NT Install & upgrade databases & sizing Configure & implement databases on fault tolerant machines Perform disaster recovery & backup procedures Perform logical/physical database design Upgrade database engine & objects, clone & tune databases to obtain optimal performance Must have Proof of legal authority to work in US Master in Comp Sci or Engg or Mathematics plus 2 yrs of exp in job offered or as a Programmer Analyst or Programmer or Database Analyst for Bachelor with 5 yrs of progressive exp) Exp in Oracle UNIX Windows NT 40hr/wk M-F 9am-5pm $95K/yr Send resume or C.V. to The Phila. Job Bank 444 N. 3rd St. 3rd Fl. Phila. PA 19123 Job Order #9094419

Software Engineer. Graphical User Interface (GUI) development for CFD software packages on Unix Platforms using Unix, X-Windows, Motif, Tcl/Tk, OpenGL and C/C++. Porting software packages to Windows NT and Windows 95 operating systems. Requires Master's degree in Computer Science or Computer Engineering and 2 years experience in above duties or any work experience providing 2 years experience in GUI development using C++, Unix, and Motif/X - Windows. Salary $62,441.60 per year 8:00 AM - 5:00 PM 40 hours per week. Must be authorized to work in the United States. Send resumes to Betty Stewart Alabama Employment Security Office 2535 Spartanburg Dr. Huntsville AL 35810-3825. Refer to Job Order AL 8048450. E.O.E.

Computer Software Analyst/Developer wanted by Software Dvlpmt Co. in Manh. Must have 1 yr. exp. dsgng & implmtg intranet applics for Co.'s corporate clients and prgmg in Perl, Java script, VB & SQL. Masters in Math, Comp Sci or Electrncs/Engg req'd. Respond to: HR Dept, Know-Ware Consulting, Inc, 370 Lexington Ave, Ste 1716, New York, NY 10017

Project Leader wanted by Software Dvlpmt & Network Integration Co. in Metuchen, NJ. Must have 1 yr exp analyzing, dsgng, dvlpg, enhancing, modifying, testing, debugging & implmtg intranet/internet applics using RDBMS C/C++, Java, and HTML or have 1 yr exp in Comp S/ware Dvlpmt & Consulting. Masters or equiv in Comp Sci, Comp Engg, Electronics/Elect Engg req'd. Respond to: HR Dept, NetCom Systems, Inc, 81 Pearl St, Metuchen, NJ 08840

S/w engineer to develop s/w and electronics for manuf. of electroforming and vacuum disc deposit. equip. Req: 5 yrs. exp. in s/w develop for optical disc tech., test equip., spincoating & injection molding, exp. in the manuf. of Ni CD and DVD stampers a +, full-time, 40 hours/wk, benefits, $68,000/year. Resume and ref. to HR, Reflekt Technology, PO Box 9111, Concord, MA 01742-9111. EOE.

Vista Technologies, Inc.

Progressive Consulting & Systms Dvlpmt Co. has immediate openings for S/ware Profl's in Client Server & Mainframe areas. Excellent salary + benefits comm. w/ exp.

Our reqmnts incl
- Unix, C, C++, Java
- Vax VMS,
- C Shell
- Sybase 10/11
- DBAs & System Administrators
- Mainframe Client Server Testers-All Envrnmts

Fax or e-mail resumes to 68 Liberty Drive Dayton, NJ 08810 Fax: (732)297-6116 E-mail: hr.vista@worldnet.att.net

Programmer-Analyst wanted by Internet Advertising Co. in Manh. Must have 2yrs exp evaluating user requests to determine compatibility & computer optimization using C++, SQL, internet protocols & relational d/bases. Bachelors in Info Networking, Comp Sci, Info Systms or related field required. Respond to: HR Dept, DoubleClick, Inc, 41 Madison Ave, 32nd Fl, NY, NY 10010

Director Professional Services wanted by Lowell MA S/ware Dsgn & Dvlpmt Co. for job in Atlanta, GA. Must have Bach. in Comp Sci, Systms Engg or Electrical Engg and 10 yrs exp in Telecommunications project mgmt, incl' 5 yrs in Professional Services Consulting and 2 yrs in CTI technlgy & generating and delivering quotes for custom CTI coding. Respond to: HR Dept, GeoTel Communications Corporation 900 Chelmsford St, Tower II, 12 Flr, Lowell, MA 01851

Product Developers (Computer Programmers) (5) to design and develop client/server software systems for the telecom industry, both GUI and Batch programs, applying knowledge of UNIX Operating System, C and embedded SQL languages. Entry and experienced level positions. B.S. in Computer Science, Engineering, Math, or related $36,000 up, commensurate with experience. Send resume to FTT Attn: Vickie Stein 2868 Acton Road, Suite 100 Birmingham Ala 35243

Programmer/Analyst needed for wireless network protocol development for the wireless network oriented components of the Windows operating systems. Must have proof of legal authority to work permanently in the US. Apply to Dynamic Mobile Data, 285 Davidson Ave #501, Somerset, NJ 08873.

Network Communications Analyst wanted by Dentist Preferred Provider Organization in Manh. Must have Bachelors in Comp Sci, Info Systms or related major and 6 mos exp. Knowl of NT 4.0, RAS, WIN frame 1.7, and MS Proxy 2.0 req'd. Respond to: HR Dept, Dental Health Alliance, LLC, 462 7th Ave #1100, New York, NY 10018.

Systems Architects (Multiple positions) needed by Computer S/ware Consulting Co. in Jacksonville FL. Must have BA/BS in Comp Sci and 5 yrs exp in job or 5 yrs exp as S/ware Developer or MS in Comp Sci and 3 yrs exp in job or 3 yrs related exp as S/ware Developer. Respond by resume to: HR Dept, Vereon Technology, Inc, 9143 Philips Hwy 320 Jacksonville FL 32256 or by email@ recruiting@vereon.com

Computers: Senior Web Developers (multiple positions) needed by Provider of subscription-based research for IT industry in Stamford, CT. Must have MS in Comp Sci (BS in Comp Sci + 2yr related exp OK). Fax or mail resumes to V.V.B. HR Dept, Gartner Group, Inc. 56 Top Gallant Rd, Stamford, CT 06904-2212. Fax (203) 316-6556.

L & A Inc. a Computer S/ware Dvlpmt Co. in Rye, NY has multiple openings to the following positions:

1. Database Analysts: Must have MS in Comp Sci, Engg or Math and 2 yrs exp in Oracle

2. Systems Analysts: Must have 2 yrs experience in C++ & Windows.

Respond by resume to: HR Dept, L & A Inc. 264 Forest Ave, Rye, NY 10580

Sr. Software Engineer needed in Portsmouth, NH for MI IT Co. Must have exp. with OOA/OOD using Jacobson's Use Cases, Rumbaugh's OMT and CORBA for 3-tier architecture. MS in EE or CS/E. Must be authorized to permanently work in the US. Send resume to: HR, JJ Associates, 2727-2nd Ave #141, Detroit, MI 48201.

SENIOR SYSTEMS ANALYST - Analyze, design, create, develop & maintain comp programs, applications & bridges for systems and Dbase using Oracle & Sybase. Write, report & advise on functional & programming specifications, data dictionary using SQR codes. Req'd: MS in Com. or Eng & 1 yr exp. Please send resume to: Attn: J. Harz, Navisys, Inc., 499 Thornall St., Edison, NJ 08837. Fax: 732-548-4340.

COMPUTERWORLD CAREERS
computerworldcareers.com

99
TECHNICAL RECRUITING & RETENTION CONFERENCE
COMPUTERWORLD
Palm Desert
CALIFORNIA
June 6-9, 1999
1-800-488-9204

The 1999 Regional Conferences

Chicago Area
TECHNICAL RECRUITING & RETENTION CONFERENCE
COMPUTERWORLD
Monday, August 30, 1999
Rosemont Convention Center
Chicago, Illinois

Philadelphia Area
TECHNICAL RECRUITING & RETENTION CONFERENCE
COMPUTERWORLD
Monday, September 13, 1999
Sheraton Valley Forge Hotel
King of Prussia, Pennsylvania

Washington DC
TECHNICAL RECRUITING & RETENTION CONFERENCE
COMPUTERWORLD
Monday, September 27, 1999
Fairview Park Marriott
Falls Church, Virginia

New England
TECHNICAL RECRUITING & RETENTION CONFERENCE
COMPUTERWORLD
Monday, October 4, 1999
Boston Marriott Burlington
Burlington, Massachusetts

Dallas Area
TECHNICAL RECRUITING & RETENTION CONFERENCE
COMPUTERWORLD
Monday, October 18, 1999
Wyndham Garden Hotel
Dallas, Texas

Atlanta Area
TECHNICAL RECRUITING & RETENTION CONFERENCE
COMPUTERWORLD
Monday, November 8, 1999
J.W. Marriott Hotel - Lenox
Atlanta, Georgia

Bay Area
TECHNICAL RECRUITING & RETENTION CONFERENCE
COMPUTERWORLD
Monday, November 15, 1999
Hotel Sofitel
San Francisco Bay, California

For registration information call 1-800-488-9204

Software Engineer Creates, develops, designs, and modifies various relational database information systems including implementation of warehouse management software for purposes of controlling and distributing data access and data transmission of various Oracle relational database systems. Uses PL/SQL, Pro*C, UNIX shell of various systems function enhancement, and integration of Oracle database applications in a multi-level database system. Requires Master's degree in Computer Science, Mathematics, or Statistics. Also requires six months experience in the job to be performed or six months experience as a Software Engineer II experience in related field, entire experience must be in the design, development, and modeling of various databases. Hours: 9:00 a.m. - 5:00 p.m. 40 hours per week at $45,000.00 per year salary. Two copies of resume to Gerald L. Gulseth, File #C100685 DWE-ALC P.O. Box 7972 Madison WI 53707-7972

Sr Software Engineer to design, develop and implement programs to adjust ledger data using MVS, COBOL, DB2 and JCL. Responsible for the installation, configuration and verification of PC and associated components in a Windows 3.1 and Windows 95 environment. Perform implementation of the Windows version of an Earnings Analysis System using Windows 95 and Windows 3.1, DB2 Client Application Enabler, OS/2 and REXX software on an OS/2 server. Responsible for troubleshooting and maintenance of software system. Train Software Engineers in troubleshooting and maintenance of software system. Requires MS in Comp. Or Info Science, or related field & 3 yrs. exp. in the job offered or 3 yrs. exp. as a Software Eng. Systems Analyst or Programmer/Analyst. Will accept BS or equiv. & 5 yrs. progressive exp. in the computer industry. Exp., which may have been obtained concurrently must incl. 3 yrs. exp. performing troubleshooting & maintenance of software system and 3 yrs. exp. using COBOL, DB2, and REXX. EOE. 40 hrs/wk, 8:00 a.m. to 5:00 p.m. Salary: $65,000/yr. Send resume (no calls) to: Joanne Pridemore, CTG, Inc., 6000 Lombardo Center, Suite 140, Seven Hills, OH 44131-2579

SENIOR SOFTWARE ENGINEER to provide on-site software consultancy in the design, development, testing, implementation and maintenance of Web based object oriented applications using technologies such as JFC, Java Beans, JDBC, RMI, Applets, Servelets, Java Script and HTML using Java JDK1.1 under RAD (Rapid Application Development) environments. Visual Cafe, Visual J++ design, development, testing, implementation and maintenance of object oriented applications using Visual C++, MFC, ODBC, COM and OLE, develop Internet/Intranet based software product design, Internet product communications using IS-API, NSAPI, CORBA, object oriented modeling using Booch, Rumbaugh and UML methodologies and client/server development using RDBMS, Oracle, Ingres, Informix, Paradox and Visual Basic. Require Masters in Computer Applications and four years experience in the job offered or as Software/Systems Analyst. Experience must include at least one year in object oriented technologies using Java/C++, 40% travel to client sites within the United States required. Salary $60,000 per year, 8 am to 5 pm, M-F. Must have proof of legal authority to work permanently in the United States. An Employer Paid Ad. No calls, send 2 copies of both resume and cover letter to: Illinois Dept. of Employment Security, 401 South State Street-7 North, Chicago, IL 60605, Attn: Joanne Breaux. Reference #V-IL 20751-N

Develops and maintains both internal and client bases systems using Foxpro, Visual Foxpro, Visual Basic C++ and other languages as required, included development and maintenance of client-server applications for internal use, requires ability to attain domain expertise in healthcare claims, perform other duties necessary to general programming and development as requested by supervisor. Work 40 hour week, M-F 8-5. One job available requiring a Bachelor degree in Computer Science, Math or Engineering and experience in Relational Databases, Foxpro, xBase, dBase, Visual Basic, and C++. Experience required may be gained through course work. Salary $35,000/year. Must have proof of legal authority to work permanently in the U.S. SEND TWO COPIES EACH OF RESUME AND COVER LETTER to: Illinois Department of Employment Security, 401 South State Street - 7 North, Chicago, Illinois 60605. Attention: Lydia Clarke. Reference Job #V-IL-20387-E.

SOFTWARE DEVELOPMENT ENGINEER. Design and develop the operating system for a large multi-processor telecommunication surveillance systems. Integrate the operating system with Internet access through network protocols. Perform network optimization, telecommunication signal monitoring, automation, fraud management and remote signal monitoring. Custom design the operating system to support execution of telecommunication related software. Develop application packages to support various signaling protocols. M.S. in Computer Science or Computer Engineering. Will accept completion of all course work leading to degree in lieu of degree. 1 year of experience in design and programming of multi-processor telecommunication surveillance systems. Yearly salary: $61,483.12. Apply at the Texas Workforce Commission, Dallas, Texas or send resume to the Texas Workforce Commission, 1117 Trinity, Room 424T, Austin, Texas 78701. JO # TX0519589. Ad Paid by an Equal Opportunity Employer

SENIOR SOFTWARE ENGINEER to provide on-site software consultancy to develop, test and implement software applications in C/C++, Fortran, Pascal, LISP and Visual Basic on systems VMS, UNIX, Windows 95/NT, Windows, Unix/AIX/HP-UX in client/server computing and object oriented environment, develop distributed Java applications using technologies such as Java Beans, Remote Method Invocation and Java IDL, interface with IBM mainframe databases, IMS and DB2 using Java on Windows 95/NT using Client Server MS Access and Oracle, develop network applications using protocols such as HTTP, HTTPS, TCP/IP and other Web oriented technologies. Require Master in Computer Science and four years experience in the job offered or as Associate Consultant. Experience must include 1 year in Java programming language. 40% travel to client sites within the United States required. Salary $57,500 per year. 8:30 am to 5 pm, M-F. Must have proof of legal authority to work permanently in the United States. An Employer Paid Ad. No calls, send 2 copies of both resume and cover letter to: Illinois Dept. of Employment Security, 401 South State Street-7 North, Chicago, IL 60605, Attn: Joanne Breaux, Reference #V-IL 20377-N.

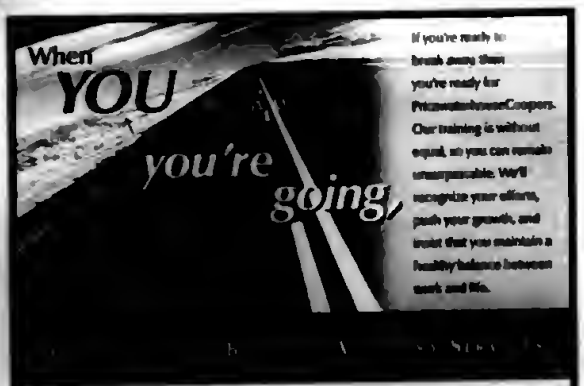
Software Engineer. Research, analyze, design, and implement Lotus Notes applications for international environmental management firm. Analyze software requirements to determine feasibility of design, evaluate interface between hardware/software and operational requirements of overall systems. Re-engineer workflow processes by automating systems enabling them using Lotus Notes, Lotus Script, Notes R/4, and Domino applications. Requires Bachelor's degree in Computer Science and 2 year experience in job offered or 2 year as a program analyst in the area of developing Lotus Notes, Lotus Script, Notes R/4 and Domino applications. Send 2 copies of resume to Leah Blackwell, Blackwell Consulting Services, 100 S. Wacker Dr. Suite 200, Chicago, IL 60606. No calls.

Software Engineer. Designs, develops, modifies, and implements a software for an 8051 based enhanced embedded microprocessor used to control scientific instrumentation and their electronic analysis functions. Performs real time embedded microprocessor systems programming using C/C++ and Assembly language to perform related analog and digital circuit design for scientific instrumentation control purposes including analog and digital design as well as sensor based electronic design and development. Requires Master's degree in Electrical Engineering or Electrical Engineering and Computer Engineering. Also requires six months experience in the job to be performed. Hours: 7:30 a.m. - 4:30 p.m. 40 hours per week at $45,000.00 per year salary. Two copies of resume to Gerald L. Gulseth, File #C100691 DWE-ALC P.O. Box 7972 Madison WI 53707-7972.

SENIOR SOFTWARE ENGINEER. MS in Computer Science is required with 1 year and six months experience in the job being offered or 1 year and six months as a Software Engineer. Responsible for the design, implementation, testing and support of the software portion of products. This includes machine control, database, user interface, reporting, network and device communication software. Work with engineers, hardware and electronics engineers, manufacturing engineers, customer support technicians and technical writers. Will program in Windows 95/NT environment. Using TCP/IP, Microsoft Visual C++, serial communication and embedded/real-time systems, write specification documents, design and code Win32 product systems software. Perform overall system testing of software and modules. Assist technical writers in manual composition, keep up to date on new technology and industry trend affecting products. Develop in-house testing and maintenance software. 40 hours per week, 8:00 am to 5:00 pm. Salary: $61,000.00 per year. Qualified applicants send resume with Social Security Numbers to: Indiana WorkForce Development, 10 North Senate Avenue, Indianapolis, Indiana 46204, Att: DPG, ID# 6942797.

UNIX Administrator/ Programmer wanted by Comp S/ware Consultants in Bingham Farms, MI. Must have Masters in Comp Sc, Engg or equiv and 1 yr exp as C/C++ Programmer, Unix Teacher/ Researcher or Network Administrator. Respond to HR Dept, Mika Systems, Inc, 30600 Telegraph Rd, Ste 3150, Bingham Farms, MI 48025.

AIX Systems Analyst needed F/T by Computer Consulting Co. in Gladstone, MO to work at job site in Columbus, OH. Must have Bachelors or equiv in Comp Sci & 2 yrs exp in UNIX (AIX) System Administration. Respond to K.D. in HR Dept, Strategic Resources, Inc, 207 N.E. 72nd St, Gladstone, MO 64118



If you're ready to break away then you're ready for PricewaterhouseCoopers. Our training is without equal, so you can remain unsurpassable. We'll recognize your efforts, push your growth, and insist that you maintain a healthy balance between work and life.

Our rapidly growing Health Care Regulatory Group (HCRG) is one of the first and largest national regulatory practices. Our clients and engagements represent the health care delivery spectrum. We currently have immediate opportunities for individuals with experience in **Lotus Notes development and support.**

These individuals are responsible for the development and support of Lotus Notes and Domino applications in version 4.5 and above. They will also be expected to be involved with all aspects of technical design, development, deployment, testing, maintenance, and support of Lotus Notes/Domino applications in all stages of the Development and Maintenance Life Cycle.

The successful candidate will have the following qualifications:

- Two plus years development experience in Lotus Notes and Domino Web Development including Lotus Command Language and Lotus Script.
- Lotus Notes/Domino Server administration experience
- Experience with MS Office products
- Experience with Windows NT Server
- HTML, Java, Java Script experience a strong plus.

We offer an an environment which promotes professional development, educational opportunities and diversity. If you're ready to define excellence and shape the future of business please send your resume to: **PricewaterhouseCoopers, Attn. S. Jacolow/CW, 1177 Avenue of the Americas, New York, NY 10036-2798, Fax: (212) 596-8090 or e-mail sam.jacolow@us.pwcglobal.com**

Compensation will be commensurate with skills and experience.

PricewaterhouseCoopers is proud to be an Equal Opportunity and Affirmative Action Employer.

Join us. Together we can change the world.℠

PRICEWATERHOUSECOOPERS

© 1999 PricewaterhouseCoopers LLP. PricewaterhouseCoopers refers to the U.S. firm of PricewaterhouseCoopers LLP and other firms in the worldwide PricewaterhouseCoopers organization.

Hyperion Solutions Corporation is a leading provider of analytic application software for reporting, analysis, modeling and planning. Hyperion's family of packaged analytic applications, OLAP server, and developer and end-user tools helps organizations maximize performance and gain competitive advantage. Hyperion's products are in use by more than 4,000 customers worldwide. We currently have an exceptional opportunity in Sunnyvale, CA.

DIRECTOR, QUALITY ENGINEERING

We seek a committed, driven professional to manage, plan, develop and execute product verification and validation tests. You will also handle Product Build and Configuration Management, analyze and report on quality measurements for all OLAP Systems products, manage sustaining engineering product releases, and advocate quality issues throughout the development team.

The ideal professional must have at least 5 years of management experience (leading Quality Engineering teams) in the software product industry along with a thorough understanding of formal Quality Assurance methodology and process, automation, code coverage, and statistical analysis tools. Previous experience in a structured engineering environment and in the client/server or database product markets is essential as is a disciplined focus on quality and process improvement. The ability to inspire creativity in building quality into our products, maximizing test coverage and excellent communication, interpersonal, team-building and mentoring skills are also a must.

We offer competitive compensation and benefits including relocation, medical/dental, 401(k), plus career growth. For immediate consideration, please send your resume and salary requirements to: **Hyperion Solutions, Attn: HR-DQE, 900 Long Ridge Road, Stamford, CT 06902, Fax (203)968-2932. Email: sandi_lurie@hyperion.com.** EOE

HYPERION

APAR INFOTECH

Apar Infotech Corporation is one of the fastest growing IT services companies with over 400 consultants and part or a $150 million worldwide conglomerate. We require Programmer/Analysts, Software Engineers and Technical Recruiters with at least 18 months of experience in one or more of the following skills.

Mainframe
UNISYS 2000, DMS 1100, IMS DB/DC or DB2, CICS, COBOL, MVS, ADABAS, NATURAL, IDMS, ADS/O

DBA
Oracle or Sybase

Midrange
AS400, RPG/400 or COBOL/400

ERP
SAP R3, ABAP/4 or Application modules, Oracle Applications and tools, JD Edwards

Client/Server
Visual Basic, SQL Server, Oracle or MS Access, Developer2000 or Designer 2000, Power Builder, UNIX, C, C++, VC++, OOAD, Progress, 4-GL or MFG/PRO, RF

Java, HTML, Active X or E-Commerce, Unix System Administration, Novell Netware or WinNT administration

Technical Recruiters
Junior and Senior positions available

Multiple positions exist. Programmer/Analyst and Jr. Technical Recruiter positions require a Bachelor's degree or equivalent. Software Engineer and Sr. Technical Recruiter positions require a Master's degree or equivalent.

If you have what it takes to be part of a fast growing company specializing in emerging technologies and unique opportunities, please mail or e-mail your resume clearly mentioning the reference number CW241 to:

The Recruiting Manager, Apar Infotech Corporation
2581 Washington Road, Suite 232, Pittsburgh, PA 15241
Website: www.apar.com Email: recruiter_sm@apar.com

PROGRAMMER/ANALYST: To design plan and schedule and develop projects using MS, SQL, Visual C++, and Visual Basic for users interface. Job requirements: Bachelor's Degree in Math, Science and 2 years experience, travel and relocation to client sites. Contact rasumas@universal-sw.com, (978) 244-9510.

BlueCross BlueShield of Montana
An Independent Licensee of the Blue Cross and Blue Shield Association

Follow the Lewis & Clark trail to Helena, Montana, the Heart of the Rockies, a recreational paradise of numerous lakes, rivers & parks.

Blue Cross and Blue Shield of Montana currently employs the following IS professionals: Software Engineers, System Programmers/DBAs, LAN System Administrators, Help Desk Analysts, Computer Operators and Operation Analysts.

Software/hardware in use and skills required include but are not related to: JES, ISPF, BAL, COBOL, IMS DB/DC, CICS, DB2, MVS/ESA, MQ Series, SQL Server, Oracle 7.3, Oracle 8.0, Oracle Developer 2000, Foxpro, VisualBasic, ODBC, HLLAPI, HTML, Lotus Domino, Windows 95/98, Windows NT 4.0, OS/2, WarpServer, Windows NT Server 4.0, Cisco routers and switches, Frame Relay, Token Ring, Ethernet, TCP/IP, Workframe, review development tools.

Blue Cross and Blue Shield of Montana offers competitive salaries and excellent benefits including retirement, educational opportunities, and flexible work hours. To apply for any Information Systems position, please make reference to position **#CW1** and send resume with cover letter indicating areas of interest and salary requirements to:

Blue Cross and Blue Shield of Montana
Attn: Human Resources
PO Box 4309
Helena, MT 59604

For more information about our company, see our website **www.bcbsmt.com**. For info regarding other employment opportunities, please call our job information line 1-800-447-7828, Ext. 3410.

Equal Opportunity Employer. M/F

Systems Analyst analyze design, develop, migrate & implement client server applications in UNIX, OS/2 and Windows NT environment using SYBASE as relational database management systems. Re-engineer existing applications to client server architecture using GUI tools such as PowerBuilder. Utilize SQL query optimization. Use proprietary case tools such as Rational Rose & Erwin for data modeling in the design & development process. Document enhancements/ modifications, provide technical support. Min Req: MS in Computer Sci with 1+ yrs progressive experience as information technology professional. Exp must include use of PowerBuilder, SQL, Rational Rose and Erwin. Salary: 75,000/yr, 40 hrs/wk. Location: Northeast U.S. Send resume Attn: Som Bhattacharya, System Edge USA, LLC, 611 Sefton Street, Philadelphia PA 19128.

Systems Analyst Analyze, design, test, migrate & implement business applications on a MVS/ESA and TSO/ISPF environment using IMS-DB2 as database management system. Re-engineer existing legacy database applications using VS-COBOL w/ JCL in the design & development process. Utilize SQL, PL/SQL/ F1/EAID for data loading/ aggregation. Document enhancements/modifications & provide technical support. Min Req: Bachelors + 5 yrs. + progressive exp as an information technology professional or Masters Degree + 2 yrs. + exp. in I.T. field. Exp must include 2+ yrs exp in use of Mainframe databases/ skills listed in this advertisement. Salary: 65,000/yr, 40 hrs/wk. Travel required. Send resume to: Software Galaxy Systems, LLC., 561 Long Barn Road, State College, PA 16803.

Growing International Oracle Practice

ARC is seeking full time employees (immigration sponsorship available) for challenging assignments. We seek skilled professionals with a minimum of 5 years in the IT industry and 2 years consulting experience in any of the following:

- ORACLE FINANCIALS
- ORACLE MANUFACTURING
- ORACLE DISTRIBUTION
- ORACLE DBA
- ORACLE APPLICATION DBA

If you have a Bachelor's degree and are looking to join a company that will recognize your achievements, please contact us. **ARC Technologies Group Inc.**, Center City Tower, Suite 910, 650 Smithfield Street, Pittsburgh, PA 15222. FAX: 412-434-6167 e-mail: blrahulsharma@arctechgroup.com.

ARC TECHNOLOGIES GROUP, INC.

Our one-day events take place in various cities across the country. When you attend, you automatically receive a copy of the Conference Resource Guide containing information presented by the speakers.

Chicago Area,
Rosemont Convention Ctr.
Chicago, IL 8/30/99

Philadelphia Area,
Sheraton Valley Forge Hotel,
King of Prussia, PA 9/13/99

Washington, DC Area,
Fairview Park Marriott,
Falls Church, VA 9/27/99

New England, Boston
Marriott Burlington,
Burlington, MA 10/4/99

Dallas Area,
Wyndham Garden Hotel,
Dallas, TX 10/18/99

Atlanta Area,
JW Marriott Hotel - Lenox,
Atlanta, GA 11/8/99

Bay Area, Hotel Sofitel, San Francisco Bay, CA 11/15/99

Call 1-800-488-9204 for more information

COMPUTERWORLD CAREERS

computerworldcareers.com

COMPUTERWORLD CAREERS

Programmer Analyst Monday through Friday, 40 Hours per week, 8:30 a.m. to 5:00 p.m., $40,000 annually. Required is a Bachelor of Science degree in Engineering, Management Information Systems, or Computer Science and One (1) year of experience in the position being offered or one (1) year of experience in the related occupation of Programmer. As part of the one (1) year of required experience in the position being offered or in the related occupation, the applicant must have had experience in requirements analysis, design, development, implementation, and enhancement of software systems to support functions of business operations; had experience in designing, developing and implementing software to support different databases, including Oracle, Ingres, Sybase, and Informix; and had experience developing warehousing systems in a UNIX environment using the C programming language. Applies principles of computer science and management information systems in designing and implementing significant enhancements to the company's advanced warehouse management software systems to ensure that the systems are reliable, understandable, maintainable, efficient, and portable. Performs requirements analysis for enhancements to the company's standard software products. Produces system level documentation in accordance with department standards. Develops user documentation suitable to hand over to a technical writer. Performs preliminary designs for enhancements to the software systems. Produces program specifications according to department standards. Participates in estimating software product enhancements. Performs integration testing for functional areas of responsibility. Develops and maintains Perl programs for doing various functions like system startup and shutdown, purging, reporting and make/migration tools. Design develops and maintains industry standard screens using C, ESQL and C-Scape. Develops applications which access a Cinee Database using IQ. Develops and maintains radio frequency applications for use with LXE TELXON SYMBOL and TEKLOGIC RF terminals. Interested applicants submit two (2) resumes to Mike Brooks, DWE-ALC, P.O. Box 7972, Madison, Wisconsin 53707-7972 WI Case File Number #C100714 AN EMPLOYER PAID AD

IF YOU'VE EVER CAMPED OUT FOR TICKETS TO COMDEX



[illegible] to you.

The reality is, you live to work on the latest technologies.* And we'll give you the skills that'll keep you on the edge.

From accelerated boot camps to training via CD-ROM and the Web, we offer it all. Need Microsoft® instruction? Novell®? Lotus®? Thinking about an Internet specialty? Our goal is to prep you for the hot IT projects, fast.

Just give us a call at 800 90TRAIN or visit us on the Web at executrain.com/itpro. And for a limited time, purchase a full certification program, and we'll throw in a free tent.* Two-person. In case you want company next time the big show rolls into town.

ExecuTrain

© 1999 ExecuTrain Corporation. All rights reserved. ExecuTrain is a registered trademark of ExecuTrain Corporation. All other trademarks and registered trademarks are properties of their respective owners. *Available at participating locations. Some restrictions apply. Visit our Web site for details.

Programmer Analyst - Oracle Specialist - Multiple Openings. Structured systems analysis, design, development, testing, quality assurance, implementation, integration, maintenance and support of large volume on-line complex integrated client-server based business, financial, banking, manufacturing and other commercial application systems in a multi-hardware/multi-software environment using centralized or distributed database systems using Oracle Relational Database Management Systems (RDBMS) and related software. Design of large application systems and databases in a Cooperative Development Environment (CDE); and analysis, design and development of applications using CASE (Computer Aided Software Engineering) tools. Bachelor's Degree (or equivalent) in Computer Science-Math/Engineering/Science/Business-Commerce and 1 yr. experience in job offered or as Software Engineer/Systems Analyst are required. Must have appropriate combination of skills as follows: 1 of A and 3 of B, or 2 of A and 2 of B. A) includes Oracle RDBMS, Oracle CASE tools (Designer, Dictionary Generator), CDE 2, Oracle Financials. B) includes PRO*C, SQL*Forms, SQL*Reporter, SQL*Plus, SQL*Menu, PL/SQL. High mobility preferred. 40 hrs/week, 8 am - 5 pm. $56,615 - $75,000 per year. Qualified applicants should contact or send resume to the Local Office Manager, Pittsburgh South Job Center, 2100 Wharton Street, Pittsburgh, PA 15203. Refer to Job Order #9094413

Programmer Analyst - PC Networking/Sys. Admin. & Appl. integration: Utilizing knowl. of networking topologies, networking technologies & PC architecture install, configure manage physically distributed computer networks & network operating systems. Provide user support, network troubleshooting, network expansion, printer services & back-up mgmt. Coordinate local remote hardware & software configuration. Implement execute operations procedures & monitor system resource utilization; perform capacity planning. Interface main application environ. w/underlying networking software. Carry out performance tuning of network for user applications. Req: B.S. in comp. sci.-math/engr'g/sci./business-commerce or equiv. 1 yr exp. in job offered or as programmer analyst/systems analyst. Must have appropriate combination of skills as follows: 2 of A & 2 of B & 1 of D; or 2 of A & 2 of B & 1 of C & 1 of D. A. includes Operating Systems: Novell NetWare, Windows NT, OS/2, Windows 95, LAN Server, Banyan Vines, LANmanager, LANtastic. B includes networking: IPX/SPX, TCP/IP, FTP, Windows for Workgroups, NetBIOS, X.25; C includes network mgmt: SNMP, LANanalyser, NetView, NetManager; D includes LAN technologies: Ethernet, Token Ring, FDDI. High mobility preferred. (Multiple positions) 40 hrs/wk; $56,615 - $75,000/yr. Report/submit resume to Tom Ruenack, Mgr., Chartiers Job Center, 10 Peluso Dr., Box 210, Chartiers, PA 15022. JO #5824044.



Taming A World Of

Technical Breakthroughs

Since its beginning in 1987, Grace Technologies has established itself as a different breed of cat. As a nationwide multi-million dollar, employee-based consultancy, our goal is to provide our 250 clients with the highest level of expertise and service to meet and exceed their business goals. By continually adapting to the dynamic landscape of the technology field, we challenge our talented team of professionals to keep ahead of the most cutting edge technologies and solutions. And in our open work environment our professionals have all the creative freedom to run wild with their technical abilities.

If you've got the skills, get ready for a future of fearless opportunities.



Data Warehousing/DSS
- Oracle Express, Brio, Informatica, COGNOS, MicroStrategy, Information Advantage, Business Objects
- Practice Manager (Atlanta)

Oracle Technical Architects
- Oracle Financials Practice Managers
- Sr. Oracle Financials Architects
- Oracle Financials Programmers
- Oracle Financials Analyzer

Peoplesoft Technical Architects
- Peoplesoft Practice Manager
- Sr. Peoplesoft Financials Architects

DBS (GEAC)
- MSD/MSA
- AP, PO, CP, HR, GL, FA, AR, IC on-site/off-site

For immediate consideration, please call/fax or send resume to: Grace Technologies, Attn: Technical Recruiter, 9 Campus Drive, 3rd Floor, Parsippany, NJ 07054. Ph: 800-767-7017, ext. 394/333/341, Fax: 800-241-2620; E-mail: Recruiting@gracetech.com. Southeast Office: Ph: 704-571-3935, Fax: 704-571-3936. Boston Office: Ph: 617-573-5025, Fax: 617-573-5026. EOE M/F/D/V

Grace

www.gracetech.com

AmeriSOURCE

Consulting - Software Engineering - Systems Integration
Online Services - Technology Transfer - New Media

One of the fastest growing companies with global vision and a presence in 12 countries, we seek IT professionals, Technical Recruiters and Marketing Executives. Excellent benefits. EOE.

Current Openings

GUIs: Visual Basic, Visual C++, PowerBuilder, Developer2000, Centura, Visual RPG, VFoxPro

ERP Solutions: SAP MFG/PRO,BaaN, Oracle Applications, PeopleSoft, JD Edwards, Lawson

Administrators: SAP R/3 BASIS, Unix, HP-UX, Solaris, AIX, OpenVMS, MVS, Lotus Notes

DBAs: DB2, Informix, Oracle, Sybase, MS SQL Server, Rdb/VMS, Progress, Adabas, Ingres

4GLs: Informix, Progress, Cognos, FOCUS, Natural/Natural2, ABAP/4, SQL

Groupware: (Lotus Notes, Domino Server), (Exchange, Outlook, CDO, VBScript, IIS)

Skillsets: (VAX COBOL, Rdb/VMS, DECforms, ACMS), (Java, JDK, JDBC, AWT, Java Beans, Java Applets), (Cobol II, DB2, CICS), (Oracle, Pro*C, PL/SQL), (Informix 4GL, ESQL/C, Unix), (Unix, C++, RDB/IPC), (VAX C, Rdb/VMS), (MS DB/DC, COBOLI, IDMS, ADS/O), (Datacom, IDEAL), (PPG/400 or CO-BOL/400, CL/400, DB2/400, Query/400), (VB, ASP, ADO, MTS), (VC++, MFC, COM/DCOM, Remote OLE), (VB SQL Server, Crystal Reports), WISE

CASE: SyncriSE (Case/2E), Designer/2000, Rational Rose, Efinity, etc.

Middleware: Tuxedo, Encina, CORBA 2.0 and IIOP-compatible ORBs (Orbix, Joonas)

Tel: 732-548-3000 Fax: 732-548-4331
Resume: AmeriSOURCE@

CORPORATE: 379 Thornall Street, Edison, NJ 08837
BOSTON: Nashua, NH ◻ CHICAGO: East Moline, IL

Pacific Northwest

METAMOR

METAMOR is a leader in the national IT market with over 4,000 consultants nationwide. Our strong ethics have led the Portland branch to 11 years of strong local market leadership & local success measured in double digits.

METAMOR has various openings in Portland for consultants with 2 years of experience.

METAMOR offers a competitive compensation & benefits package. For immediate consideration mail, fax or e-mail your resume to:

METAMOR Information Technology Services
10220 SW Greenburg Road, Suite 301,
Dept C, Portland, OR 97223
Fax: (503) 293-3090
Tel: (503) 293-3499
Toll free: (888) 882-8326
E-mail: gpc@metamor-its.com
Web: http://www.metamor-its.com

SCS AMERICA

SOFTWARE CONSULTING SERVICES

SCS is a fast growing National Implementation Partner for SAP. We provide a full range of SAP services both directly and indirectly to clients. We are searching nationwide for enthusiastic SAP analysts with the following requirements:

- SAP experience in FI, CO, AM, PS, HR, SD, MM, WM, PP, QM, SM, Basis or Abap/4.
- Some positions require 2 years SAP experience and/or Bachelors or Masters Degree
- Extensive travel and possible relocation involved.

For immediate consideration mail, fax or e-mail your resume to:

Job #A05786581

SCS America Inc.
950 Tower Lane
#1850
Foster City, CA 94404

(650) 578-6530 (Fax)
Resumes@scsamerica.com

computerworldcareers.com

COMPUTERWORLD CAREERS

computerworldcareers.com

99

TECHNICAL RECRUITING & RETENTION CONFERENCE

COMPUTERWORLD

June 6-9,1999

Palm Desert
CALIFORNIA

1-800-488-9204

Programmer Analyst (Unix Networking/Sys. Admin. & Sys. Prog.) Install, customize & fine tune performance of operating sys. on heterogeneous platforms. Achieve connectivity of workstations using networking technologies. Perform sys. configuration mgmt. for both h'dware & s'ware. Provide user support & network trouble-shooting services. Carry out performance tuning of application packages such as Relational Database Mgmt systems (RDBMS) under Unix operating system. Manage TCP/IP based services such as NFS, NIS, TFP, TELNET, etc. Perform network mgmt. using SNMP & related tools. Ensure fault tolerant printer services & back-up mgmt. procedures. Utilizing knowl. of installation of WAN connectivity w/heterogeneous h'dware platforms using routers &/or gateways over leased & dedicated circuits. Using knowl. of internals on operating sys. for patching & coding device drivers & network progrm'g using (P/PX, TLI, Streams & SOCKETS. Req: Bachelors degree in comp. sci. - math / eng'g / sci./bus. - commerce) (or equiv.) A 1 yr exp in job or as software engineer/systems analyst. Must have appropriate combination of skills as follows: 1 of A & 2 of B or 1 of D; Or 1 of A 2 of B & 2 of C; or 1 of A & 2 of C & 2 of D as follows: A) Operating Sys.: IBM AIX, HP-UX, Sun Solaris, DEC Open VMS/Ultrix, SCO Unix/ODT, USL Unix SVR4, UnixWare; B) LAN/WAN Connectivity/Networking Protocols TCP/IP, IPX/SPX, NFS, Bridges, Routers, Gateways, X.25, X.400, ISDN, ATM; C) System/Network Prgrm'g Perl, Korn, Shell, C Shell, RCP, TLI, Streams, SOCKETS, API & toolkits, ODK, AWK, SED, LEX, YACC; D) Networking techs: Ethernet, Token Ring, FDDI, high mobility preferred (multiple positions). 40 hrs/wk, $ & &, $13 - $78,000/yr. Report/submit resume to Joan Lang, Mgr., Pittsburgh West Job Center, 320 Blimer Drive, Pittsburgh, PA 15205. JO #1024200.

Software Engineer (3 openings) Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. Work involves extensive travel and frequent relocation. Must have one year of experience using 1 of Group A and 1 of Group B and 1 of Group C OR 1 of A and 2 of B OR 1 of A and 2 of C as follows: Group A - Windows 3.1, Windows 95, Windows 98, Windows NT, UNIX, UP-UX, IRIX, Sun OS; Group B - Visual C++, Visual C, C, C++, Visual Basic, PowerBuilder, Group C - JAVA, TCP/IP, HTML, MFC, CGI, PERL, ASP, COM/DCOM, Active X, MTS. Bachelor's degree in one of several limited fields: Computer Sci/Appls Eng., Chem., Math or Physics. Salary is $60,000 per/yr. 40 hrs/wk, 9:00-5:00 p.m. Please submit resumes to Mr. Terry Kinney, Mgr., Armstrong County Job Center, 1270 Water Street, P.O. Box 759, Kittanning, PA 16201. Job Order No. 7048499.

Software engineer will be responsible for the design of software solutions using object oriented analysts and design, implementation of the design using object oriented programming mentoring/lead programming in MFC, OLE, VC++ and Multimedia in Windows. Will test, (unit and integrate) of the software packages developed, technical support in project planning and requirement analysis; develop and direct software system testing procedures, programming and documentation. Should be willing to relocate on a project by project basis. 40 hour week, 9 AM-5PM. $60,000 per year. Master's/Foreign degree equivalent in Mechanical Engineering + 2 years experience in the job offered or 2 years as a senior programmer. Submit resume to Dept. of Labor/Bureau of Workforce Program Support, P.O. Box 10669, Tallahassee, FL 32302. JOFL 1912446.

Vigo e

Into A World Of

Possibilities.

As you look out toward your opportunity horizon, what do you see? Imagine... CNF Transportation, Inc. There you will behold a vista of innovation, challenge and growth stretching out before you as wide open as your own potential. Here is where you can focus your intuition, ideas and initiative. CNF Transportation, Inc., the technological leader in the transportation and logistics industry—it's where a world of opportunity is within your reach!

- IT Corporate Systems Manager
- DB2 DBA
- Oracle DBA
- Oracle Developer/Analyst
- Associate Oracle DBA
- Systems—IBM mainframe
- Systems Analyst—IEF Composer
- EDI Communications Analyst
- Sr. Systems Analyst—EDI
- AS/400 Application Developer

With access to the most advanced EDI computer and communications systems and our strong partnerships with Oracle, PeopleSoft and IBM, we have created an environment where all of our IT professionals are proud and dynamic contributing members. We have the resources to reward our diverse team with an outstanding salary and benefits program including: 401(k), retirement plan, tuition reimbursement, stock purchase plan and incentive compensation. Please send your resume to: **CNF Service Company, Staffing Services—CW322, PO Box 3477, Portland, OR 97208; Fax: (503) 450-2168; e-mail: jobs@cnf.com**

CNF TRANSPORTATION

All hires pending pre-employment drug screening. We are an Equal Opportunity Employer.

Where ideas carry weight

SAP Jobs

Superhighway To Success

800.599.9550

IntelliMark

Technical Professionals

Rapid growth IT/Software company hiring for consulting positions throughout the US. Seeking Systems & Software Engineers (MS+3 or BS+5) with 3-5 yrs exp in any of the following areas:

- SAP R/3 or Peoplesoft
- Oracle, Sybase or VAX
- RDB, RDBMS
- JAVA Web Development
- UNIX or NT Administration
- GUI Design (UNIX/Windows)
- Mainframe: COBOL or Assembler, CICS, DB2 or IMS
- DEC VAX DECFORMS, ACMS or VAX MUMPS

Junior positions (2 yrs exp) available. We offer comprehensive benefits including medical/dental/life insurance and 401(k). Forward resume indicating position of interest to: COMFORCE, Attn: CS Division, 15305 Dallas Parkway, Suite 1150, LB-19, Addison, TX 75001, FAX (972) 668-5150, or email jobs@comforcet.com. EOE.

COMFORCE
Information Technologies, Inc.
www.comforce.com

SOFTWARE ENGINEER..

ORACLE PROFESSIONALS

Check Out: http://itjobs.cendant.com

If you do, you will find terrific career opportunities with our rapidly growing organization! Cendant Corporation is a Fortune 300 Company with global operations in the areas of residential real estate, hospitality services, car rental operations, membership services and on-line commerce. We have the following opportunities available:

DEVELOPER/2000 ENGINEER

LAKEWOOD, COLORADO - At least 1 year of Oracle Forms 4.5 and Reports 2.5 experience is needed. Respond with resume to: Human Resources Department C, Resort Computer Corporation, 12596 W. Bayaud #200, Lakewood, CO 80228. Fax# 303-232-9556. E-mail recruiter@rcoden.com

DATABASE ADMINISTRATORS

MOUNT LAUREL, NEW JERSEY - 2+ years experience working with a major relational database is needed along with proficiency in UNIX scripts. Respond with resume to: Cendant Mortgage, Attn: HRG-PL, 6000 Atrium Way, Mount Laurel, NJ 08054. Fax# 609-439-4836. E-mail: jobs@mortgageservs.com

LEAD ANALYST

GARDEN CITY, LONG ISLAND - 5+ years in database design, testing, implementation, maintenance and administration is needed. Respond with resume to: Cendant IT, Attn: Human Resources Department C, 900 Old Country Road, Garden City, NY 11530. Fax# 516-222-6368. E-mail: employme@cendant.com

Your efforts will be rewarded with challenge, career opportunity and highly competitive rewards and benefits. Equal opportunity employer m/f/d/v

CENDANT

SENIOR SOFTWARE ENGINEERS required. UNIX systems programming and middleware support in a distributed computing environment. Design, integrate and support applications software using Sybase and C++. Master's degree required in Math, Computers, Engineering or any other related field of study plus three years of experience in the job duties described above. Employer will accept a bachelor's degree plus 5 years of experience in place of the Master's and 3 above mentioned. Must have proof of legal authority to work in the U.S. Salary $80,000/year for a 40 - hour work week. Report or submit resume to the Local Office Manager of the Pittsburgh South Job Center, 2100 Wharton Street, Pittsburgh, PA 15203. J.O. Number 9047989. Ad paid by an Equal Opportunity Employer.

Immediate Full time positions available in CA, NC, NY, NJ, MA and IL. Oracle, Dev. 2000, DBA, C, UNIX, VB, VC++, SQL Server, JAVA, HTML, CGI, Perl, Peoplesoft, Oracle Apps, SAP, ManMan, VAX/VMS, HP/3000. Fax resume (Attn. Recruiter): 408-577-1761

National Aeronautics and Space Administration

Join the Leader in Aerospace as NASA's

Deputy Chief Information Officer (Security)

ES Annual Salary to 125,900

Competitive Benefit and Retirement Packages

Searching for an energetic and proactive individual with proven executive level experience to work on the team that has the world's largest internet site and delivers the highest volume of information while maintaining security of systems supporting critical aerospace and aeronautic missions. The Deputy Chief Information Officer (Security) will oversee implementation of NASA's comprehensive agencywide IT security program. The successful candidate will assess NASA's IT security vulnerabilities, act as liaison with the public on IT security interests, oversee IT security training program, propose and advocate IT security budget guidelines, establish corrective action strategies and provide vision, leadership and oversight in developing an end-to-end agencywide IT security architecture.

Qualified applicants should call **(202) 358-4655** for a copy of the announcement and application form.

Position is posted on the OPM website.

http://www.usajobs.opm.gov/

Applications must be postmarked by April 19, 1999.

NASA

Come hear theTRUTH



THEN CHALLENGE THE
WHO CREATED IT.

SD|99
software
DEVELOPMENT

SOFTWARE
DEVELOPMENT
San Francisco
Jone Center
Exhibition
May 10 12
Conference
May 9 13

call for registration information (800) 441-8826 email us at sd99@mfi.com or visit www.sdexpo.com

For more information on advertising,
call (800) 343-6474

ATTENTION!

Attention!™ will page you, or call you on the pbone when critical system or network problems occur.

- ✔ Supports UNIX, Windows NT, Windows 95, and Open VMS
- ✔ Notification via numeric and alpha pagers, telephones, and custom methods
- ✔ Interfaces with all leading system/network management products
- ✔ Unlimited escalation guarantees the right people are contacted
- ✔ Personnel call in to *Attention!* to acknowledge receipt of page
- ✔ Fault tolerant design supports redundant *Attention!* servers for immediate failover
- ✔ Event filtering suppresses redundant notification for same problem
- ✔ Heartbeat monitoring guarantees systems and critical applications are running 24x7

www.attentionsoftware.com

ATTENTION Software
2175 N. Academy Circle • Suite 100 • Colorado Springs, CO 80909
(719) 591-9110 • fax (719) 591-9590

Call for free demo software 800-684-1684

Rocket Your Career With Our FREE Self-Study Course!

Call Now to Get Your First Course at No Charge
Limited Time Offer

Discover the fast and easy way to increase your I.T. knowledge and prepare for I.T. certification. Our computer-based training courses provide a self-paced and cost-effective alternative to classroom training. See for yourself how ForeFront Direct can give you the skills you need to accelerate your I.T. career. Call today for your FREE I.T. training course!

- Open the Door to Great Career Opportunities
- Raise Your Income
- Gain Valuable Skills, Knowledge and Technical Recognition
- Study at Your Own Pace
- Interactive Hands-on Exercises
- Online and Telephone Mentoring Available
- One-on-One Training Consulting

- MCSE
- MCP
- Webmaster
- CNE
- Networking
- MCSD
- Visual Basic
- C++
- Lotus
- PC Repair
- Novell CIP
- CNA
- A+ Certification
- Java
- Visual C++
- Oracle
- Office 97
- Windows 98

Call now to get your FREE Course!
TOLL FREE **1-877-TRAINING** 1-877-872-4646
25400 US Hwy 19N #285 • Clearwater FL 33763 1-800-653-4933 (727) 724-8994 Fax (727) 726-8922

FOREFRONT DIRECT
A CBT Group Company





Northeast Training Group, Inc.

WHAT ARE YOUR IT TRAINING NEEDS?

Northeast Training Group, Inc.'s (NTGI) mission is to be your premier solution provider to the productivity problems that keep you awake at night.

- Hottest Technologies Training — Internet/Intranet, Java, Win NT
- Management training — Project Management, and Software Skills
- Technical skills training — Mainframe/Client-Server/End User

Call **Sue Goldberg,** today for your **FREE** Consultation.

617.469.5557 • e-mail: ntgi@gis.net
www.gis.net/~ntgi/

It all comes down to questions. Questions that challenge your expertise about Microsoft products. Question yourself – are you ready? Be absolutely sure. With Spike and the gang's certification guarantee, you will be. Because once you've completed the program, you'll pass with flying colors or get your money back.* And don't worry, because as Microsoft Certification changes, Transcender will have you covered...without question.

- Most Realistic MCSE and MCSD Simulations Available
- Detailed Answers and Explanations
- NEW! Computer Adaptive Testing Features
- NEW! Simulation Questions
- Money Back If You Don't Pass Guarantee*
- From $129 - $179

Transcender. America's #1 Exam Preparation Software. Transcender Corporation

To order, call Howard @ (615) 726-8779 or fax (615) 726-8884; 242 Louise Ave.; Nashville, TN 37203.
www.transcender.com
©1999 Transcender Corp. All Rights Reserved. Microsoft is a registered trademark of Microsoft Corporation. Multi-user licenses are available. *Call or see our Web site for details.

AD INDEX

SALES OFFICES

Computerworld Headquarters:
500 Old Connecticut Path, PO Box 9171, Framingham, MA 01701-9171
Phone: (508) 879-0700, Fax: (508) 875-4394

Senior Vice President/Publisher
Michela O'Connor Abrams

Vice President/Associate Publisher - West
Elaine R. Offenbach

Regional Vice President/Associate Publisher - East
Sherry Driscoll

Regional Vice President Southwest
Michelle Gerus

Regional Vice President Northwest
Linda Holbrook

EAST

DIRECTOR: Isabelle Kane. **SENIOR DISTRICT MANAGER:** Laurie Marmone. **SALES OPERATIONS MANAGER:** Louise Murray. **SENIOR ACCOUNT EXECUTIVE:** Nathaniel Hampson. **SALES ASSOCIATES:** Cheryl Evangelopoulos, Samantha Hadley. 500 Old Connecticut Path, Framingham, MA 01701 (508) 879-0700 Fax (508) 270-3882 TDD (800) 428-6244

DIRECTOR: Lisa Ladle-Wallace. 5242 River Park Villas Dr., St. Augustine, FL 32092. (800) 779-5622 Fax (800) 779-6622

DIRECTOR: Fred LaSapio. **DISTRICT MANAGER:** John Bosse. **SENIOR ACCOUNT EXECUTIVE:** Maureen Grady. **SALES & OFFICE ASSOCIATE:** Susan Nesmith. **SENIOR SALES ASSOCIATE:** Joan Delvecchio. **SALES ASSOCIATE:** John Radzevich. Mack Center 1, 365 West Passaic St. Rochelle Park, NJ 07662 (201) 587-0090 Fax (201) 587-9255. (201) 587-0288 TDD (800) 208-0208

NORTHWEST

SENIOR DISTRICT MANAGER: Judith Hamerman. **DISTRICT MANAGERS:** Angela Flores, Dennice Reiter. **SENIOR ACCOUNT EXECUTIVE:** Kevin Eberwein. **ACCOUNT EXECUTIVE:** Monica Kormeczy. **SALES ASSOCIATES:** Bonni-Jo Bouchard, Carrie Petersen. **SALES OPERATIONS MANAGER:** Emmie Hung. 177 Bovet Road, Suite 400, San Mateo, CA 94402 (650) 357-0200 Fax (650) 524-7000 TDD (800) 900-3179

DIRECTOR: Sharon Chin. **SENIOR SALES ASSOCIATE:** Jill Coffey. 10800 N.E. 8th Street, Suite 820, Bellevue, WA 98004 (425) 451-0211 Fax (425) 454-3922

SENIOR DISTRICT MANAGER: Blayne Long. 875 N. Michigan Avenue, Suite 2946, Chicago, IL 60611 (312) 943-4266 Fax (312) 943-2214

SOUTHWEST

DIRECTOR: Ernie Chamberlain. **SENIOR ACCOUNT EXECUTIVES:** Claude Garbanne, Julie Compton. **SALES ASSOCIATES:** Stefan Maye, Brian Shendledecker. **SALES OPERATIONS COORDINATOR:** Madeleine Paquz. 177 Bovet Road, Suite 400, San Mateo, CA 94402 (650) 357-0200 Fax (650) 524-7000 TDD (800) 900-3179

SENIOR DISTRICT MANAGER: Jennifer Madjos. **SALES ASSOCIATE:** Doreen Robinson. 14651 Dallas Parkway, Suite 108, Dallas, TX 75240 (972) 233-0882 Fax (972) 701-9008 TDD (800) 822-4910

ACCOUNT DIRECTOR: Cindy Wages. **FIELD MARKETING EXECUTIVE:** Robert J. Pietsch. **SALES ASSOCIATE:** Meredith Turner. 18831 Von Karman Avenue, Suite 200, Irvine, CA 92612 (949) 250-3942 Fax (949) 476-8724

ADVERTISING OPERATIONS PRINT & ON-LINE

SENIOR DISPLAY ADVERTISING COORDINATOR: Gregg Presley. **DISPLAY ADVERTISING COORDINATOR:** Peter Coen. (508) 879-0700 Fax (508) 879-0446

ENTERPRISE BUSINESS SOLUTIONS

BOSTON: Project Coordinator/Heidi Broadley. Managing Editor/Peter Bochner. 500 Old Connecticut Path, Box 9171, Framingham, MA 01701-9171 (508) 879-0700 Fax (508) 875-8931. **SAN FRANCISCO:** Sales Operations Coordinator/Nikki Wilson. 177 Bovet Road, Suite 400, San Mateo, CA 94402 (650) 357-0200 Fax (650) 524-7000. **EAST:** Director/Peter Dinter. 875 N. Michigan Ave., Suite 2946, Chicago, IL 60611. (312) 397-6360 Fax (312) 943-2214

MARKETPLACE/DIRECT RESPONSE CARDS

Sales Manager/Laura Gomes. 500 Old Connecticut Path, Box 9171, Framingham, MA 01701-9171 (508) 820-8249 Fax (508) 875-3701. **EAST:** Account Director/Norma Tamburrino, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-8276 Fax 201 712 0431. **MIDWEST:** Account Director/Linda Clinton, 500 Old Connecticut Path, Box 9171, Framingham, MA 01701-9171 (508) 820-8268 Fax (508) 875-3701. **CALIFORNIA, ALASKA, SENW:** Account Executive/Jason Bishop, 500 Old Connecticut Path, Box 9171, Framingham, MA 01701-9171 (508) 271-8009 Fax (508) 875-3701. **WEST:** Account Executive/Maureen Roberts. 500 Old Connecticut Path, Box 9171, Framingham, MA 01701-9171 (508) 271-8007 Fax (508) 875-3701

RECRUITMENT ADVERTISING SALES OFFICES

Marketing Director/Derek E. Hulsizer. Operations Director/Cynthia Delany. 500 Old Connecticut Path, Framingham, MA 01701-9171 (800) 343-6474. **NEW ENGLAND & UPSTATE NEW YORK:** Regional Manager/Nancy Percival. 500 Old Connecticut Path, Framingham, MA 01701 (800) 343-6474, Senior Account Executive/Nancy Mack, (800) 343-6474. **MID-ATLANTIC:** Regional Manager/Jay Savell. 4100 Fernicroft Lane, Bethlehem, PA 18020-7617 (610) 867-5268. Senior Account Executive/Caryn Dietl, (800) 343-6474 TDD: (800) 208-0288. **SOUTH ATLANTIC:** Regional Manager/Katie Kress-Taylor, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 280-5162. Product Manager/Pauline Smith (800) 343-6474. **MIDWEST:** Regional Manager/Pat Powers, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018 (847) 827-4433. Account Executives/Nicholas Burke, Susan Hammond, (800) 343-6474 TDD: (800) 227-9437. **WEST:** Regional Manager/Christopher Glenz. 177 Bovet Road, Suite 400, San Mateo CA 94402 (415) 665-2443. Account Executives/Kate Angelone, Chris Connery, (800) 343-6474

MARKETING: Marketing Director/Chris McGarry. Art Director/Gary Swan. Copywriter/Steve Starnates. **CIRCULATION:** Vice President Circulation/Maureen Burke. **PRODUCTION:** Production Director/Christopher P. Cuneo. Production Manager/Beverly Wulff. **DISTRIBUTION:** Distribution Manager/Bob Wescott. **RESEARCH:** IT Market Analyst/David Daoud, Research Analyst/Matt Duffy, Research Analyst/Candace O'Keefe, Associate Research Analyst/Lori Karalekas

COMPUTERWORLD

President/CEO
Jim Martin

Vice President/Marketing
Cynthia L. Ahart
(508) 820-8272

Vice President/CIO
Rick Broughton
(508) 620-7700

Vice President/ Recruitment Advertising
John Corrigan
(508) 820-8273

Vice President/Editor
Paul Gillin
(508) 620-7724

Vice President/ Information Management Group
Scott R. Kleinman
(650) 524-7060

Vice President/ Manufacturing Operations
Carolyn Medeiros
(508) 620-7733

Vice President/ Enterprise Business Solutions
Ronald L. Milton
(508) 820-8661

Vice President/ Strategic Circulation Operations
Eric Schmierer
(508) 820-8217

Senior Vice President/Finance
Matthew C. Smith
(508) 820-8102

INTERNATIONAL DATA GROUP

CHAIRMAN OF THE BOARD: *Patrick J. McGovern* **PRESIDENT:** *Kelly Conlin* **CHIEF OPERATING OFFICER:** *Jim Casella*

IDG

Computerworld is a publication of International Data Group, which informs more people world-wide about information technology than any other company in the world. With annual revenues of $2.25 billion, IDG is the leading global provider of IT media, research and exposition. IDG publishes more than 290 computer newspapers and magazines and 700 book titles in 75 countries, led by Computerworld/Informationweek, Macworld, Network World, PC World, Channel World, and the "For Dummies" global product lines. IDG offers online users the largest network of technology sites around the world through IDG.net (http://www.idg.net), which comprises more than 225 targeted web sites in 55 countries. IDG is also a leading producer of 168 computer-related expositions in 20 countries, and its research arm, International Data Corporation (IDC), provides technology research and analysis through 48 offices in 41 countries, world-wide. Company information is available at http://www.idg.com

ADVERTISERS INDEX

ASPECT www.aspect.com	46-47
Boole & Babbage www.boole.com	49
Cisco www.cisco.com	38-39
Citrix www.citrix.com	13
Compaq Computer Corp. Desktop www.compaq.com	11
Compaq Computer Corp. Brand www.compaq.com	42-43
Computer Associates www.cai.com	7
Dun and Bradstreet www.dnbcorp.com	55
Exide Electronics www.exide.com	78-79
GE Capital IT Solutions www.gecits.ge.com	25, 27
Hewlett-Packard www.hp.com	40/41
IBM Commercial Desktop www.ibm.com	65
imr global www.imr.com	45
Information Builders www.ibi.com	31
Intel www.intel.com	28-29
JD Edwards www.jdedwards.com	10
Micro Focus www.microfocus.com (800) 872-6265	26
Microsoft Windows 2000 www.microsoft.com	22-23
Microsoft Exchange Sever www.microsoft.com	34-37
Microsoft Office 2000 www.microsoft.com	52-53
Mii3 www.mii3.com	C3
New Horizons www.newhorizons.com	9
Qwest www.qwest.com	76
Renaissance Consulting Inc. www.consultrenaissance.com	74
Rogue Wave Software www.roguewave.com	83*
SAP America www.sap.com	70*
SAS Institute www.sas.com	C2, 50, 60
Silicon Graphics www.sgi.com/go/visual	21
Syncsort www.syncsort.com	5
Unisys www.unisys.com (800) 874-8647 X100	C4
UUNET www.uunet.com	15
Vantive www.vantive.com	17
Xerox www.xerox.com	18-19
Xircom www.xircom.com	51

***Regional Select Edition**

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

HAVE A PROBLEM WITH YOUR COMPUTERWORLD SUBSCRIPTION?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:
Computerworld, P.O. Box 2043, Marion, Ohio 43305-2043.

Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

Address Changes or Other Changes to Your Subscription
All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line.

Your New Address Goes Here: **Address shown:** ☐ Home ☐ Business

NAME
COMPANY
ADDRESS
CITY STATE ZIP

Other Questions and Problems
It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free number is available: **1-800-552-4431**
Outside U.S. call (740) 382-3322. Internet address: circulation@cw.com

ZIP STATE COMPANY TITLE NAME CITY

COMPUTERWORLD allows advertisers and other companies to use its mailing list for selected offers we feel would be of interest to you. We screen these offers carefully. If you do not want to remain on the promotion list, please write to the following address: COMPUTERWORLD, Circulation Department, 500 Old Connecticut Path, Framingham, MA 01701

PERCENT		PERCENT	
Spyglass Inc.	78.6	Hnc Software (L)	-48.8
Westell Technology Inc.	71.2	Network Associates (L)	-44.2
ETrade Group Inc. (H)	56.0	Picturetel (L)	-27.4
Safegard Scientifics (H)	42.2	Aspen Technology Inc.	-27.4
Globalstar Telecom. Ltd.	28.5	Jack Henry Associates (L)	-25.1
Documentum (L)	28.2	Edify Corp. (L)	-24.4
Open Text Corp. (H)	28.0	Business Objects S.A.	-23.3
Comdisco	25.7	Autodesk Inc.	-22.7

DOLLAR		DOLLAR	
Yahoo Inc. (H)	32.94	Hnc Software (L)	-17.19
ETrade Group Inc. (H)	32.75	Network Associates (L)	-13.31
Safegard Scientifics (H)	28.38	Jack Henry Associates (L)	-9.00
Excite Inc. (H)	17.63	Autodesk Inc.	-8.63
America Online (H)	15.81	Business Objects S.A.	-6.81
@home Corp. (H)	15.75	Checkpoint Software Tech. Ltd.	-6.44
SGS-Thomson Microelectronics (H)	15.00	Citrix Systems Inc.	-5.19
Lycos Inc.	13.38	American Mgt. Systems	-5.13

ERP VENDORS' STOCKS IN SLUMP

Some analysts urge caution; others say buy

BY TOM OIEDERICH

INDUSTRY ALMANAC

THIS HAS BEEN a less-than-stellar year for vendors of enterprise resource planning (ERP) software, and stock prices are down. Most analysts aren't sure when the market — facing a drop in demand after 1998's year 2000-driven sales spike — will hit bottom, and they don't recommend investing right now.

PeopleSoft Inc. (Nasdaq:PSFT) and SAP AG (NYSE:SAP) have warned of dismal first quarters, and analysts say Oracle Corp. (Nasdaq:ORCL), J. D. Edwards & Co. (Nasdaq:JDEC) and others would suffer a similar fate. Such predictions have hurt stocks (see chart).

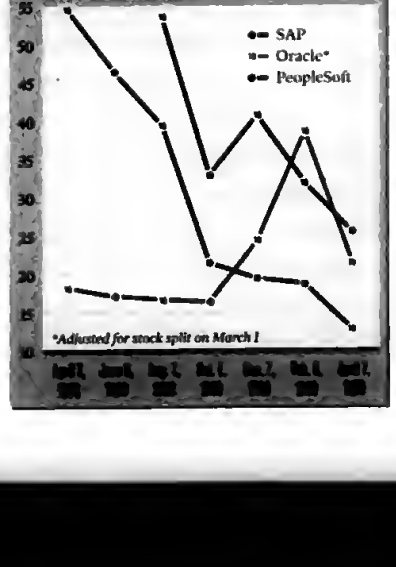
Analyst Brian Goodstadt at Standard & Poor's Equity Group in New York, has Neutral and Hold ratings oo most major ERP vendors. "Things will get worse before they get better, so I would stay on the sidelines," he says.

NationsBanc Mootgomery Securities Inc. is cautious on the sector and advises clients to decrease their ERP holdings. ERP firms are working "feverishly to develop the Net-based products for today's corporate IT appetite," says Bob Austin, a NationsBanc analyst.

Analyst Steve Kohn at Sound View Technology Group Inc. in San Francisco says his firm sees a slow 1999 but an uptick next year. He says most vendors are building the right new applications.

Michael Murphy, editor of the "California Technology Stock Letter" in Half Moon Bay, Calif., says *now* is the time to buy ERP stock. "Everybody's saying that enterprise software is a disaster area, and the Gartner Group says there's going to be a nuclear freeze in the second half of the year — so stay away," he says. "But I just see a bunch of companies with individual problems."

Murphy's top five ERP stock picks are: Informix Corp. (Nasdaq:IFMX), Oracle, Remedy Corp. (Nasdaq:RMDY), PeopleSoft and Ross Systems Inc. (Nasdaq:ROSS).



ISSUE	52-WEEK	NAME	APRIL 9 7 PM	WK NET CHANGE	WK PCT CHANGE
SOFTWARE OFF -7.9%					
ADBE	59.81	23.06	Adobe Systems Inc	51.75	0.56	1.0
APPW	58.87	8.81	Applix Technologies Inc	9.44	1.56	27.8
ARSW	89.63	29.63	Autodesk Inc	29.31	6.63	22.7
AVID	47.75	11.06	Avid Technology	18.75	4.19	8.6
BDSY	34.87	16.06	Bowne & Co Inc	24.94	2.38	10.5
BORL	87.50	8.12	Borland Intl Inc	27.94	8.81	23.3
CDN	39.00	10.12	Cadence Design Systems	25.38	0.63	2.4
CRTSY	63.56	8.56	CBT Group Plc	10.75	1.75	14.0
CHKP	96.06	10.87	Checkpoint Software Techs	33.19	9.44	18.1
CTAS	53.75	23.12	Cotec Systems Inc	37.06	5.19	13.0
COGNF	30.56	14.75	Cognos Inc	28.63	0.88	2.8
CA	67.63	24.00	Computer Assoc Internationl Inc	36.19	1.19	3.4
CPWR	40.00	16.31	Compuware Corp	31.13	3.38	13.1
DCTM	56.62	9.37	Documentum Inc	13.00	2.88	28.7
EVE	47.75	12.00	Electronic Data Processing	44.88	3.75	9.1
HNCS	87.12	13.75	Hnc Software Inc	18.56	17.19	48.1
ICAE	55.75	13.38	Ida Systems	12.38	1.13	7.8
IFMX	14.38	3.56	Informix Software Inc	8.38	0.38	5.1
INTU	110.75	34.81	Intuit Inc	103.00	3.75	3.7
JKHY	55.00	29.63	Jack Henry Associates	29.19	3.00	9.3
JDEC	44.00	10.87	J D Edwards & Co	13.63	4.38	24.3
LGTO	67.75	23.56	Legato Software Inc	43.38	4.00	10.2
MACR	48.00	17.31	Macromedia Inc	43.25	0.87	1.8
MANU	88.37	0.25	Manugistics Group Inc	8.19	0.38	5.7
MENT	15.06	3.63	Mentor Graphics	17.44	0.38	10.0
MSFT	90.62	40.38	Microsoft Corp	93.88	2.56	2.8
NATI	87.38	17.00	National Instruments	38.81	10.31	48.2
NSBK	54.63	20.37	Network Security	34.75	6.44	8.4
NOVL	79.12	18.75	Novell Inc	25.19	0.44	1.8
ORCL	83.19	17.75	Oracle Corp	25.69	0.56	2.4
PMTC	18.31	8.56	Parametric Technology Corp	10.56	2.75	14.0
PSFT	51.69	13.56	PeopleSoft Inc (L)	14.69	0.56	0.8
PKSW	39.06	27.50	Peoto	34.56	4.06	10.4
PLAT	34.31	9.38	Platinum Technology Inc	14.38	1.63	4.4
RSTC	10.62	10.00	Reinhold Software Corp	12.38	0.25	1.9
SAP	20.12	223.75	SAP AG	29.38	10.19	10.1
SCKR	29.00	8.38	Secure Computing Corp (L)	8.81	1.00	10.2
SI	28.75	20.13	Sterling Commerce Inc	28.19	0.31	1.1
SCSC	37.81	18.12	Sterling Software Inc	20.44	2.38	12.3
SSMC	29.00	7.00	Structural Dynamics Research	10.56	0.38	3.7
SYBS	11.62	4.50	Sybase Inc	6.88	0.44	6.8
SYMC	32.62	8.56	Symantec Corp	13.38	2.38	17.8
SNPS	61.75	24.50	Synopsys	47.75	5.13	9.7
SCTC	20.87	7.81	Systems & Computer Technology	8.75	0.31	3.3
BANK	40.00	11.87	The Bisys Co Inc	13.87	1.00	17.1
WNTU	88.75	9.38	The Wanlen Corp	10.38	1.13	9.8
YSAI	51.00	27.00	Ysoft Sys Anal	34.00	0.00	1.1
VRTS	88.12	23.75	Veritas Software Corp (H)	79.00	1.56	2.1
WWDU	38.63	11.38	World Wide Systems Inc (L)	12.00	0.00	0.2
TELECOMMUNICATIONS CARRIERS UP 5.0%						
ATI	80.12	62.75	Bellsouth Corporation (NYSE)	60.63	4.38	6.8
AT	58.50	38.75	Bell Corp (H)	61.75	4.88	7.8
AIT	69.37	41.00	Ameritech Corp	63.75	0.00	0.0
AMERF	24.31	10.37	Ameritel Corp	17.00	0.63	0.0
T	88.12	60.87	AT&T	60.38	0.38	0.6
BCE	54.38	35.38	BCE Inc (H)	60.63	0.25	10.8
BEL	50.38	40.62	Bell Atlantic	30.19	0.25	0.8
BLS	50.00	34.00	Bell South	43.56	2.63	6.4
CSN	33.62	8.50	Cincinnati Bell Inc	29.19	0.38	0.3
CMCSK	79.63	37.62	Comcast	38.38	3.56	9.4
CQ	40.75	21.75	Comsat Corp	29.00	0.00	0.0
CTR	30.00	61.38	Gte Communications Inc	10.00	1.38	2.5
GSTRF	59.12	0.19	Globalstar Telecom Ltd	10.31	1.56	29.5
SFTI	71.81	40.00	Sprint Corp (H)	64.13	3.38	5.4
NXTL	42.38	13.37	Nextel Communications (H)	56.38	0.00	0.0
SPCT	56.38	26.00	Panamsat	40.00	0.75	1.8
SCOOF	105.25	30.75	Qualcomm Inc	100.13	8.75	7.1
SBC	60.00	35.38	SBC Communications	54.00	2.19	0.7
TDS	100.62	39.63	Telephone and Data Systems	92.00	4.13	0.1
USW	56.00	56.19	Us West	56.38	0.56	1.0
VIA	56.87	24.62	Viacom (H)	30.00	3.00	1.0
WCII	69.12	10.00	Worldcom Communications Inc	42.38	0.06	10.1
WCOM	104.25	30.00	MCI Worldcom Inc	56.81	0.38	1.7
SERVICES OFF -0.4%						
ACXM	31.25	19.38	Acxiom Corp	27.00	2.00	10.0
ACS	54.75	27.38	Affiliated Computer Servs	43.38	1.00	3.0
AMSY	40.25	10.00	Amsys or Mgt Systems	28.19	5.19	19.1
ADP	49.30	30.19	Automatic Data Processing	41.38	0.38	0.8
BOYS	69.31	30.38	Boys Town Inc	56.19	0.50	0.8
CATP	30.37	30.63	Cambridge Technology Ptnrs	13.19	1.19	7.9
CEN	49.38	40.38	Cendant	56.63	1.38	2.7
CBR	30.87	13.19	Ceridian	18.19	0.63	3.0
CSG	73.25	30.75	Comdisco	27.38	0.56	25.7
CHRZ	50.00	8.25	Computer Horizons Corp (L)	10.00	0.00	0.0
CSC	34.87	56.25	Computer Sciences	56.38	0.25	10.0
EDS	30.38	34.38	Eds Systems Inc	63.00	0.81	0.7
EDS	30.38	60.00	Electronic Data Systems	30.00	1.31	2.0
FDC	44.50	16.00	First Data Group	61.00	0.38	1.0
FISV	30.37	56.75	Fiserv	57.75	1.00	3.0
IT	30.00	16.31	Gartner Group	21.38	1.38	7.0
HSA	30.00	10.25	Source (L)	27.19	0.19	3.0
IMRC	50.25	26.19	Inacom Corp	41.00	0.00	1.5
PAYX	56.00	30.13	Paychex Inc	40.00	1.19	2.5
PERI	20.25	4.38	Personnel Group of America	5.38	1.38	17.1
RUBY	30.00	10.38	Ruby Tuesday Inc	17.25	0.50	2.8
SAPE	30.87	28.25	Sapient Corp	47.25	0.50	1.3
SBIS	30.50	20.38	Shared Medical Systems	57.00	0.63	1.1
SBS	30.00	21.38	Sungard Data Systems	30.38	2.19	7.2
SYNH	37.87	0.00	Syntel Inc	13.00	2.06	17.0
TECD	53.12	14.50	Tech Data	37.63	10.00	2.0
TSS	30.25	10.00	Total System Services Inc	10.00	0.75	1.3
TSAI	99.00	27.38	Transaction Sys Architects	30.38	0.38	1.1
NETWORKS UP 4.9%						
COMS	58.12	40.00	3Com Corp (L)	32.00	0.38	1.1
ADCT	52.13	19.75	ADC Telecommunications Inc (NASD	50.63	1.13	2.2
ANIC	30.00	0.00	Anicor	22.75	1.38	1.8
ASND	102.00	51.00	Ascend Communications Inc (H)	89.56	11.38	13.7
BNYN	19.38	2.19	Bay Networks Inc	10.00	2.00	00.0
CS	10.31	6.62	Cabletron Systems	7.56	0.19	2.3
CNET	00.00	0.75	Cisco Systems Inc	0.00	0.56	7.4
CSCO	120.00	41.12	Cisco Systems Inc (H)	38.75	0.00	0.0
EFOLF	30.38	10.75	Efi Internet	30.75	1.00	4.1
FORE	00.00	0.00	Fore Systems Inc	32.00	2.00	10.0
HRS	53.00	27.38	Harris Corp (L)	27.62	0.38	1.3
HAYS	57.10	30.37	Hughes Electronics Hs	54.38	4.10	8.0
IRICY	34.00	10.38	I Bm Frenman	25.00	0.38	3.5
LU	56.38	26.38	Lucent Technologies (H)	63.38	0.72	10.0
MANRF	7.75	1.75	Madge Networks	2.00	0.00	2.4
NCR	10.31	0.37	Network Computing + co	4.38	0.38	1.3
NWK	49.62	7.31	Network Equipment Tech (L)	7.00	4.38	12.1

ISSUE	52-WEEK	NAME	APRIL 9 7 PM	WK NET CHANGE	WK PCT CHANGE
SEMICONDUCTORS, CHIPS & EQUIPMENT UP 7.3%					
ADI	29.62	7.87	Analog Inc	13.56	0.88	7.0
AMCC	33.00	0.37	Applied Micro Cir	10.00	1.75	9.1
ALTR	58.63	28.25	Altera Corp	60.25	6.31	9.2
ADI	28.87	12.00	Analog Devices	24.00	4.25	21.5
ABAT	7.87	2.13	Applied Micro Cir	6.44	0.81	9.1
ASMI	50.37	12.63	Asm Lithography Hldg N.V.	40.56	7.10	21.2
BRCM	53.00	27.31	Broadcom Corp	37.63	6.38	12.2
INTC	103.00	60.81	Intel Corp	101.25	10.75	8.0
KLAC	69.00	36.75	Kla Instruments	50.31	4.00	10.1
LLTC	63.38	40.56	Linear Technology Inc	50.81	4.56	10.0
LSI	37.63	19.56	Lsi Logic	30.63	6.06	16.5
MXIM	80.00	27.31	Maxim Integrated Products	50.63	3.81	8.1
MU	56.56	19.38	Micron Technology	47.88	7.88	7.1
MOT	82.75	39.37	Motorola Inc	62.75	8.06	12.4
NSM	74.19	7.62	National Semiconductor	47.50	7.38	8.4
NVLS	178.69	36.87	Novellus Systems Inc	120.13	10.75	8.0
NVDA	69.00	26.75	Nvidia Corp	50.31	4.00	10.1
PMCS	163.00	60.81	Pmc-Sierra Inc	140.56	7.00	5.2
QLGC	69.00	30.00	Qlogic Corp	50.00	4.00	10.0
TXN	86.00	41.00	Texas Instruments	80.00	6.63	9.1
XLNX	104.87	45.31	Xilinx Inc	90.50	7.00	7.2
COMPUTER SYSTEMS UP 2.0%						
AAPL	67.31	24.00	Apple Computer Inc	30.38	0.38	1.2
ASPN	12.00	1.62	Aspen Systems	8.50	0.00	0.0
CPQ	51.75	27.03	Compaq	30.75	0.00	0.0
DIGI	29.00	7.50	Data Research	10.75	0.31	2.8
DELL	58.20	18.00	Dell Computer Corp	43.30	2.00	7.0
GTW	58.00	36.12	Gateway 2000 Inc	51.38	1.50	10.0
HWP	83.87	47.00	Hewlett-Packard Co	69.00	1.00	2.2
IBM	130.81	82.19	Ibm Corp	79.75	2.38	2.8
NSM	104.75	103.75	Nsm	104.25	10.38	0.7
MLHC	24.75	8.56	Micron	10.38	1.00	9.7
MSFT	67.75	30.37	Microsoft Corp	83.81	8.69	10.3
QUAT	30.00	13.00	Quantum Corp-Dlt & Storage	30.25	0.38	1.2
NCSS	30.75	23.00	Ncss	30.13	0.38	0.9
SUNW	30.00	11.00	Sun C	80.00	0.56	1.1
PRCM	13.75	3.50	Procom Tech Inc	8.81	0.69	7.5
SGMS	29.25	5.00	Scientific Computer Systems	8.38	0.38	3.3
SMH	29.50	7.37	Seagate Techn	30.00	0.37	3.4
SNH	104.50	66.25	Sony Mfn	107.00	0.00	0.0
SUNW	77.50	10.12	Sun Microsystems Inc	90.38	7.87	10.1
TEAM	6.63	2.00	Triad Systems	3.25	0.56	8.7
TRID	4.87	0.37	Triumph Systems	2.00	0.06	4.1
WANG	30.37	19.87	Wang	20.06	1.00	5.3
INTERNET UP 10.3%						
AMZN	109.87	10.87	Amazon.com Inc	80.88	10.00	7.7
AOL	69.38	17.25	America Online Inc	109.38	10.87	10.0
AMGN	139.50	29.56	Amgen Corp	108.75	15.25	10.0
CMPS	59.38	5.75	Compuserve (H)	31.00	2.88	10.0
CNCH	29.38	5.87	Compuserve Inc	19.00	2.38	10.0
EGRP	13.87	0.93	Egry Corp (L)	4.00	1.00	20.0
EBAY	69.38	5.00	E Trade Group Inc	30.75	56.25	20.0
INFT	110.06	10.56	Excite Inc (H)	30.38	17.63	13.7
IBEX	100.00	14.87	Ibeximate	19.56	5.38	0.0
LCOS	105.31	25.38	Lycos Inc	104.63	10.38	10.2
MMH	29.12	0.25	Open Market Inc	15.31	2.00	10.1
OTEX	30.75	10.00	Open Text Corp (H)	30.75	8.25	20.0
YHOO	30.00	0.37	Yahoo! Inc (H)	69.38	7.56	17.0
GMHA	1.38	0.25	Quarterdeck Corp	0.56	0.00	0.0
SWTI	56.62	5.62	Security Dynamics	10.38	3.38	10.3
SPRD	32.25	0.56	Sapphire Inc	15.38	7.00	70.0
VRSN	244.38	80.56	Verisign Inc (H)	200.25	56.00	10.0
STORAGE & PERIPHERALS UP 1.2%						
ADPT	30.75	7.87	Adaptec Inc	23.38	0.56	1.0
APCC	55.00	20.18	American Power Conversion	50.00	3.00	10.0
CANNF	29.63	17.38	Canon Inc	24.63	10.00	0.0
DBD	44.56	10.12	Diebold Inc	30.31	1.00	1.0
EK	30.00	20.12	Eastman Kodak Co (L)	62.50	1.25	2.0
EMC	100.06	30.87	Emc	100.25	7.75	8.1
IOMG	10.00	2.00	Iomega	8.06	0.18	0.7
LEXR	120.62	30.00	Lexmark Int'l Group, Inc. (H)	103.81	0.00	2.0
QNTM	29.38	10.87	Quantum	10.00	0.20	2.0
STK	64.25	20.12	Storage Technology	70.00	1.00	5.0
STPN	30.12	20.12	Storage Technology	50.20	10.20	10.0
VIFA	43.87	13.00	Tandem	24.81	0.18	0.0
WANG	63.00	30.00	Wang	00.02	9.50	10.1

KEY: **(H)** - New annual high reached in period
(L) - New annual low reached in period

Copyright Nordby International Inc., Boulder, Colo. (nordby.com) This information is based on sources believed to be reliable, and while extensive efforts are made to assure its accuracy, no guarantees can be made. Nordby International and *Computerworld* assume no liability for inaccuracies. For information on Nordby's customized financial research services, call (303) 938-1877.

How to Contact Computerworld

TELEPHONE/FAX

Main phone number (508) 879-0700
All editors unless otherwise noted below
Main fax number (508) 875-8931
24-hour news tip line (508) 820-8555

E-MAIL

Our Web address is **www.computerworld.com.**

All staff members can be reached via e-mail on the Internet using the form: **firstname_lastname@computerworld.com.**

All IDG News Service correspondents can be reached using the form: **firstname_lastname@idg.com.**

LETTERS TO THE EDITOR

Letters to the editor are welcome and should be sent to: **letters@computerworld.com.**

Include your address and telephone number

MAIL ADDRESS

PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701

SUBSCRIPTIONS/BACK ISSUES

Phone (800) 552-4431
E-mail circulation@cw.com
Back issues (508) 820-8167

REPRINTS/PERMISSIONS

Phone Ray Trynovich (717) 560-2001, ext. 24
E-mail sales@rmsreprints.com

CONTACTING CW EDITORS

We invite readers to call or write with their comments and ideas. It is best to submit ideas to one of the department editors and the appropriate beat reporter.

Editor in Chief Paul Gillin (508) 620-7724
Executive Editor Maryfran Johnson (508) 820-8179

DEPARTMENT EDITORS

News Editor Patricia Keefe (508) 820-8183
Business Editor Kevin Fogarty (508) 820-8246
Technology Editor Robert L. Scheier (508) 820-8226
Assistant News Editor Michael Goldberg (508) 620-7799
Assistant News Editor Mitch Betts (202) 347-6718
Assistant Business Editor Anne McCrory (508) 820-8205
Assistant Technology Editor Steve Ulfelder (508) 820-7745
West Coast Bureau Chief Galen Gruman (650) 524-7110
Online News Editor Sharon Machlis, (508) 820-8231
Industry Editor Joseph E. Maglitta (508) 820-8223

REPORTERS

Labor issues, IS careers, health care industry Barb Cole-Gomolski (760) 728-9858
General assignment Stacy Collett (703) 404-1409
Grid servers, thin clients Stewart Deck (508) 820-8255
Databases, data warehousing, transportation industry Tom Dienstbier (650) 524-7117
Computerworld online Nancy Dillon (650) 524-7114
New products, multimedia, storage Sharon Gaudin (508) 820-8122
Microsoft, BT, BackOffice, Novell, publishing/advertising industries Matt Hamblen (508) 820-8567
Mobile computing, desktop systems, aerospace, defense contractors Ann Harrison (508) 820-8182
IT management, year 2000, Internet services Thomas Hoffman (914) 948-9630
IT services, systems integration, outsourcing, encryption Julia King (610) 532-7599
Microsoft, investigative reports Kim S. Nash (773) 871-3035
Computerworld online Kathleen Ohlson (508) 820-8225
Application development, desktop applications, retailers David Orenstein (650) 524-7716
Java, intranets, business-to-business E-commerce, pharmaceutical industry Carol Sliwa (508) 628-4731
Client/server software, Unix applications, process manufacturing Craig Stedman (508) 820-8120
Federal government antitrust, legal issues Patrick Thibodeau (202) 333-2448
Midrange hardware, Unix, mainframes, heavy manufacturing Jaikumar Vijayan (508) 820-8220
Internetworking, telecommunications, automotive and related industries Bob Wallace (508) 820-8214

OPINIONS

Staff Columnist Frank Hayes (503) 252-0100
Columns Editor Galen Gruman (650) 524-7110

FEATURES EDITORS

IT management, leadership Allan E. Alter (508) 620-7714
IT management, year 2000 Rick Saia (508) 820-8118
Field Report James Connolly (508) 820-8144
Executive Technology Cathleen Gagne (508) 620-7729
Reviews Russell Kay (508) 820-8175
Field Report, reviews Cynthia Morgan (508) 820-8177
IT Careers David B. Weldon (508) 820-8166
IT Careers Mari Keefe (508) 628-4906
QuickStudy Stefanie McCann (508) 820-8274
Special Projects Amy Mulroy (508) 620-7754

FEATURES WRITERS

IT management Kathleen Melymuka (508) 628-4931
Business, technology topics Gary H. Anthes (202) 347-0134
Technology, product reviews Kevin Burden (508) 620-7717

RESEARCH

Lorraine Cosgrove **research manager**
Laura Hunt **librarian, research analyst**
Keith Shaw **graphics coordinator**

COPY DESK

Ellen Fanning, **managing editor/production** (508) 820-8174
Jamie Eckle **assistant managing editor/production**
David Ramel **assistant managing editor/special projects**
Pat Hyde **senior copy editor** Jean Consilvio Tom Gaudet
Adam Perez Bob Rawsen **copy editors**

GRAPHIC DESIGN

Tom Monahan **design director** (508) 820-8218 Stephanie Faucher **art director/features** Mitchell J. Hayes, **art director/news** John R. Bruton Nancy Kowal David Waugh Mary Beth Welch **associate art directors** Aunt O'Connor **graphic designer** Rich Tennant John Klossner **cartoonists**

ADMINISTRATIVE SUPPORT

Linda Gorgone **office manager** (ext. 8176)
Connie Brown (ext. 8178) Lorraine Witzell (ext. 8139)
Chris Flanagan (650) 524-7111 **editorial assistants**

COMPUTERWORLD ONLINE

Johanna Ambrosio **director**
Sharon Machlis, **online news editor** (508) 820-8231
Tom Diedrich **reporter** (650) 524-7117 Kathleen Ohlson, **reporter** (508) 820-8225, Jeremy Selwyn **online services manager**
Aaron Bishop **audio engineer**

CONTRIBUTING COLUMNISTS

Joe Auer James Champy John Gantz Peter G. W. Keen, Bill Laberis, David Moschella, Fran Quittel, Paul A. Strassmann Don Tapscott Ed Yourdon

COMPANIES IN THIS ISSUE

Page number refers to page on which story begins. Company names can also be searched at www.computerworld.com

[illegible] 69
[illegible] 85
[illegible] 69
[illegible] *
[illegible] 70
[illegible] 69
[illegible] *
[illegible] 81
[illegible] 24
[illegible] 71
[illegible] 37, 69
[illegible] 73
[illegible] 14
[illegible] 50
[illegible] 81
[illegible] 70
[illegible] 1
[illegible] 69
[illegible] 69
[illegible] 69

Continued from page 1

Carmakers

pliers. Eventually, it's expected this network will be linked to North America's ANX.

"All along, the underlying strategy has been to go global," said Don Hedeen, ANX director at the Troy, Mich.-based Automotive Industry Action Group (AIAG). That group's largest members drove the creation of ANX, which went live last fall. The AIAG has been providing technical information to support the European effort, Hedeen added.

Ford Motor Co. officials said they see great benefit in the North American ANX being tied to a European version.

"We basically want an ANX-type infrastructure available on a global basis to support our product development initiative," which includes computer-aided design, engineering and manufacturing technologies, said Dennis Kirchoff, a member of Ford's global supplier electronic communications group.

"We may develop a vehicle in one area and build it in several other places," he said.

Obstacles Ahead

But Kirchoff and others acknowledged that the European effort faces challenges.

One is finding an organization similar to the AIAG to bring together the auto industries in each main European country. "We want to deal with Europe as a region, not on a country-by-country basis, because it's not very efficient to reinvent the wheel," he said.

Auto associations from the U.K., France, Germany and Spain have agreed to help fund the effort to create such an organization, Hedeen said.

A European extranet would also have to live up to the service quality and security of the North American version, said Mark Jackson, a transport systems manager at DaimlerChrysler AG.

Dealing with the reality of heavy government involvement in telecommunications in some European countries could be an obstacle, he said.

The AIAG handles security equipment and network service provider certification for ANX through agreements with the International Computer Security Association and Bellcore.

The first steps toward a European ANX have already begun. The first ANX-like pilot was completed in Germany with the help of service provider Deutsche Telekom AG. Participants include Audi AG, Robert Bosch GmbH, BMW AG, DaimlerChrysler, Ford, Adam Opel AG, AB Volvo and Volkswagen AG, Hedeen said. ◗

JUST THE FACTS

Benefits of the ANX network

- High-quality data transport
- Very secure communications
- Less expensive than dedicated lines
- Puts automakers and suppliers on same network
- Promises global reach

CORPORATE VALUE EXPECTED FOR LINUX

Report: Departmental, Web server roles best for freeware Unix

BY DAVID ORENSTEIN

LINUX MAY NOT be on par with more-corporate commercial operating systems, but users and the analyst firm that published a head-to-head comparison of operating systems last week asserted that Linux has substantial corporate value and vast potential.

The report last week by D. H. Brown Associates Inc. in Port Chester, N.Y., compared two leading versions of Linux with Windows NT and several commercial Unix operating systems. (Linux is a public-domain variant of Unix.) An executive summary is posted at *www.dhbrown.com/dhbrown/linux.html*.

"They both fall short — in terms of shipping production-grade implementations of proven, nontrivial [symmetric multiprocessing] scalability, high-availability clustering capabilities, journaling file systems" and other capabilities, the report concluded.

But D. H. Brown analyst Bill Moran added that Linux is already well-suited to many departmental and Web server roles, especially at its nearly free price. "You'd be foolish to shut your eyes to it," he said.

Although server vendors such as IBM, Hewlett-Packard Co. and Compaq Computer Corp. have embraced Linux, they might not want to develop it to the point where it competes with their commercial Unix offerings, Moran said.

The open-source development community that has traditionally built Linux has brought it far, but production-grade operating-system development requires intensive cooperation of hardware and software engineers, he said.

Users agreed that Linux isn't ready to support corporate applications and data, but they said it can get to that level.

"You don't want to use it on the really high end, and you don't want to use it on the average user's desktop," said Ben Woodard, print systems manager at Cisco Systems Inc., which uses Linux for all its print servers.

"I do not see Glaxo Wellcome using Linux for our high-end enterprise needs, but there are appropriate opportunities in the workgroup and development areas," said Tony Ho, project leader at drug maker Glaxo Wellcome Inc. in Mississauga, Ontario. ◗

MOREONLINE

For more information on Linux, visit our Web site
www.computerworld.com/more

Continued from page 1

Are U.S. Programmers Slackers?

programmer productivity at an average of 7,700 lines of code, compared with 16,700 lines for non-U.S. programmers.

In other words, the average U.S. IT organization delivers software at "half the rate of the rest of the world," Rubin said.

Part of the problem, said Rubin and IT executives at the briefing, is that many U.S. IT professionals have become "fat and happy" and don't push themselves in a market where corporate earnings are generally strong and the risk of being fired is low. "My programming staff are 9-to-5ers, and complacency is a big problem," said Paul Garrin, CIO at Holy Name Hospital in Teaneck, N.J.

Garrin said he plans to step up the measurement of IT costs and staff productivity "to light a fire under people and show them where they stand."

Programming expert Ed Yourdon said any drop-off in U.S. programmer productivity is more likely the result of job burnout from putting in 70-hour workweeks to meet business pressures and deliver IT projects faster.

"What I'm seeing are programmers saying, 'To hell with it. I'm tired, I'm frazzled, and I'm not going to push as hard as I used to,' " said Yourdon, chairman of Arlington, Mass.-based research firm Cutter Consortium.

Complacency, Rubin said, is just one of the contributors to the U.S. productivity lag.

Rubin said U.S. programmers are often paid more, educated less and trained less than their foreign counterparts (see chart, page 1). Another factor in the productivity gap is that U.S. workers are more often pulled away to work on year 2000 projects, he said.

To boost productivity and cut costs, some firms are shifting more development work to offshore software factories in low-wage nations such as India, Ireland and Mexico.

But not all IT executives are sold on offshore programming. Garrin said when Holy Name Hospital off-loaded some of its Cobol programming to an Indian firm in 1992, the software came back buggy, there were language barriers, and he often had to wake up for 2 a.m. teleconferences to bridge the time zones.

One alternative is to tap reusable software components and object technologies to improve software development productivity, said Cathy M. Mattax, an IT director at Fannie Mae in Washington. "Europeans tend to have a more disciplined, engineered approach to software development. I think we can carry some of that philosophy over to the U.S. without making people feel like they're being boxed-in," Mattax said.

Part of the productivity split lies in the different software approaches taken by U.S. and non-U.S. organizations. The European IT units at Morgan Guaranty Trust Co. "lean more on using packaged software than we do in the U.S.," which helps boost the Europeans' overall productivity, said Anthony Hutchings, a vice president at the New York-based investment firm.

There's more in-house software development at U.S. IT units, he said, which often leads to "greater redundancies" in application development among various business units. ◗

Periodical postage paid at Framingham, Mass., and other mailing offices. Printed under Canadian International Publication agreement #0385687. Computerworld (ISSN 0010-4841) is published weekly, except a single combined issue for the last week in December and the first week in January by Computerworld, Inc., 500 Old Connecticut Path, Box 9171, Framingham, Mass. 01701-9171. Copyright 1999 by Computerworld Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed. Back issues, if available, may be purchased from the circulation department. Photocopy rights: permission to photocopy for internal or personal use is granted by Computerworld Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress St., Salem, Mass. 01970. Reprints (minimum 100 copies) and permission to reprint may be purchased from Ray Trybulski, Computerworld Reprints, c/o Reprint Management Services, 147 West Airport Rd., PO Box 5383, Lancaster, Pa. 17606-5383, (717) 490-3000, ext. 28, Fax: (717) 560-2063, Web site: www.reprintscenter.com, E-mail: sales@reprintscenter.com. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $4 a copy U.S., $48 a year Canada, $110 a year Central & So. America, $150 (surface) a year Europe, $295 a year all other countries, $295 a year. Subscriptions call toll free (800) 552-4431. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Box 2044, Marion, Ohio 43306.

WORLD'S FIRST Y2K COIN

▸ *Maybe she has a year 2000 headache, or maybe she's just weary. But Miss Liberty is sitting down on the back side of the first Y2K commemorative coin, available for $49.50 each by calling (800) 472-6327. It's a $20-denomination silver piece authorized by the Republic of Liberia. The design refers to year 2000 in nine different ways, including sign language and ancient symbols.*



INSIDE LINES

OUT WITH THE OLD And it seemed like euro conversions were going so well, too. Last Tuesday, 55,000 German customers of Deutsche Bank's Bank 24 subsidiary discovered they were overdrawn – by **about 4 billion euros**. Though euro-ready software was created to perform a quarterly calculation for each account, someone mistakenly used the old, **euro-unfriendly version**. A spokeswoman said the problem was corrected by Thursday with no damage done – and Bank 24 is **getting rid** of the old software.

LOOKING FOR A DATE Oracle is prodding all of its application users toward browser-based versions of the software but hasn't decided just when the support plug will be pulled on the last Windows fat-client release. It's discussing the issue with its independent applications user group "to figure out what the right date is," said Senior Vice President **Ron Wohl**. Support for character-mode applications will end in **2001**.

BIKE PERKS Thanks to the labor crunch, IT professionals are **enjoying special benefits**, often in the form of bonuses. But at Northwest Natural Gas in Portland, Ore., the hot perk for IT staffers is getting to **bring their bicycles** – which many ride to work – into the office. "The building managers didn't like it," said CIO **Chuck Beyer**, "but some of these people paid more for their bikes than I did for my first car."

RANDOM NUMBERS U.S. companies spend on average of **$700 per employee** every year to remove errors from computer programs, according to Meta Group research fellow **Howard Rubin**. . . . Résumé management software vendor Restrac in Lexington, Mass., says it fills **25% of its job openings** via the Web. . . . The North American auto industry's automotive network exchange extranet now includes **74 automakers** and suppliers, with 70 more trading partners on deck. . . . Microsoft executive **Brian Valentine** says he has **95% confidence** that the next Windows 2000 beta will ship by the end of this month.

SPIN CONTROL? Executives at **ETrade Group** reportedly congratulated one another for the stack of news stories chronicling the online brokerage's recent **spate of system outages**. Their theory: ETrade must be a hot company to be getting all that publicity. Does that mean the IT staff will get a bonus if the servers catch fire and explode? News editor **Patricia Keefe** doesn't know, but you can send her news tips and tidbits at **patricia_keefe@computerworld.com** or call (508) 820-8183.

Flexible Keyboard Resists Coffee, Sandwich Crumbs

HARD TO BELIEVE, but here's a full-size keyboard flexible enough to be rolled up like a rubber bath mat into a 3-in. tube. Take it with your laptop when traveling or use it in hazardous settings such as factories and homes with children. The closed, spill-proof surface can be washed and even disinfected. The vendor claims the keys, which have laser-etched labels, are noiseless and touch-sensitive. The $120 Smart keyboard can be ordered from Magnate Distribution Ltd. in Liverpool, England (*sales@magnatedistribution.com*).

THE SMART KEYBOARD is waterproof, noiseless and can be rolled up for transport. It can be switched off so you can rest objects on the flat surface without entering data or commands. And an industrial version can even be used in cold labs or hot steel mills



The 5th Wave



"I assume you'll be forward-thinking enough to allow '.dog' as a valid domain name."

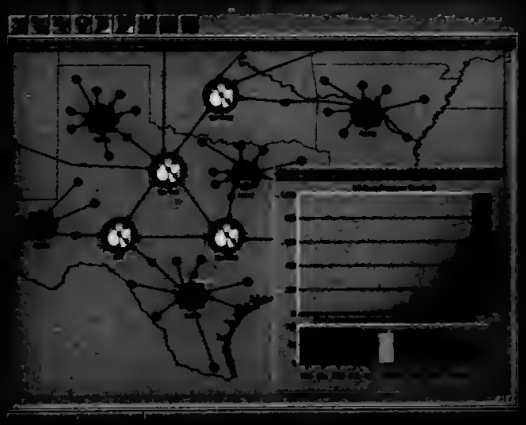
FOR NETWORKS AND APPLICATIONS

IT Decisions

can involve very high stakes...



Can your business afford to gamble on the outcome?



IT Decisions Guru helps you ...

See us at
Networld+Interop
booth 1855

PREMIER PARTNER

IT Guru

©1998 Unisys Corporation. Amadeus is a service mark of Amadeus Marketing, S.A.



Sure we go on vacation.
But we never quite get away from it all.



Our clients have challenges you just can't leave at the office. Take Amadeus,[SM] one of the world's leading global travel reservation systems. Their challenge was a result of phenomenal success: As system demand soared, they called Unisys. We dug in and developed a breakthrough solution that increased capacity and improved response time. At Unisys, we're always thinking of better ways to meet our clients' needs. No matter where we happen to be. www.unisys.com

UNISYS We eat, sleep and drink this stuff.

